

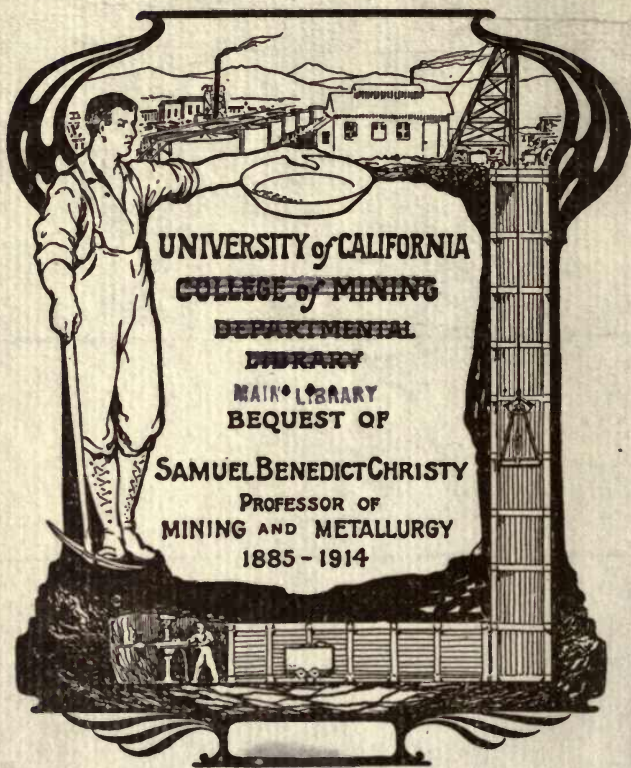
*S. Pollock*  
*7*  
**The**  
**IDEAL**  
**FITTER**

UC-NRLF



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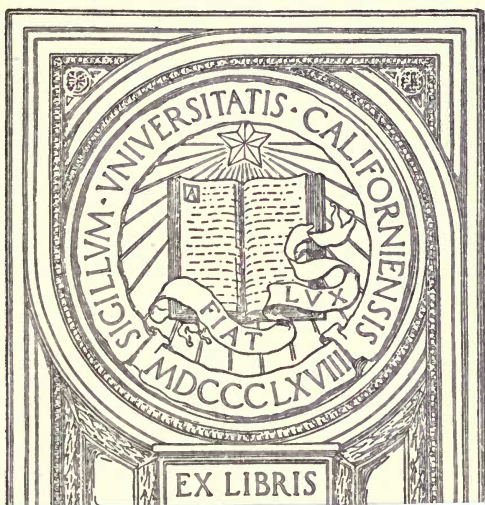
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# THE IDEAL FITTER

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AMERICAN & IDEAL  
RADIATORS BOILERS

AMERICAN RADIATOR COMPANY

TH 74 69  
A5  
1910



GENERAL OFFICES: CHICAGO

# AMERICAN RADIATOR COMPANY

NEW YORK . . . . .	104-108 West Forty-Second Street
BOSTON . . . . .	129-131 Federal Street
PHILADELPHIA . . . . .	1342 Arch Street
BUFFALO . . . . .	Court and Franklin Streets
PITTSBURGH . . . . .	601-603 Hartje Building
CINCINNATI . . . . .	Fourth and Elm Streets
WASHINGTON . . . . .	317 Union Trust Building
ATLANTA . . . . .	508 Candler Building
DETROIT . . . . .	Woodward and Jefferson Avenues
CLEVELAND . . . . .	710 Prospect Avenue
CHICAGO . . . . .	282-286 Michigan Avenue
CHICAGO . . . . .	36-38 Dearborn Street
MILWAUKEE . . . . .	214 Sycamore Street
INDIANAPOLIS . . . . .	243 North Pennsylvania Street
ST. LOUIS . . . . .	Olive and Fifteenth Streets
MINNEAPOLIS . . . . .	229 Fifth Street, South
OMAHA . . . . .	413-417 South Tenth Street
KANSAS CITY . . . . .	312-314 East Eighth Street
DENVER . . . . .	1522 Glenarm Street
SAN FRANCISCO . . . . .	1033-1037 Monadnock Building
SEATTLE . . . . .	522 Pike Street
BRANTFORD, ONT. . . . .	17 Market Street
LONDON, W . . . . .	439-441 Oxford Street
PARIS . . . . .	24 Rue de Mogador
BERLIN . . . . .	35 Alexandrinen Strasse
MILAN . . . . .	98 Corso Sempione

Prices listed herein take effect July 1, 1910, superseding all former lists; and are subject to change without notice. All former editions of this catalogue should be destroyed.

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**A**LL products represented in this catalogue are made with the most particular manufacturing care and have been rigidly tested before offering them for sale. We are, therefore, confident that the Boilers, Radiators, and Specialties herein listed will appeal to the best judgment of all who install strictly first-class heating outfits.

AMERICAN Radiators are made in America in eight plants exclusively; IDEAL Boilers are made in three plants devoted to that product only. Similar products are made in four allied plants in Europe. We are therefore constantly in close touch with the needs and most advanced practices of the heating industry of two continents. This broad knowledge of modern requirements, coupled with the best materials, scientific tests, and concentration in manufacturing methods, enables us to produce the most reliable heating appliances in the market.

With these extensive foundries, twenty offices, thirty warehouses (widely distributed throughout the United States), and a large force of traveling salesmen, we are equipped as no other concern in this business to give the most acceptable and prompt service to all alike, and at all times.

All orders are welcome—large or small.

Faithfully yours,

**AMERICAN RADIATOR COMPANY**

Chicago, August 1, 1910.

---

Discounts quoted to the regular Trade only.

303911<sup>3</sup>



Pierce Plant, Buffalo, N. Y.



Detroit Plant, Detroit, Mich.



Litchfield Plant,  
Litchfield, Ill.



Standard Plant, Buffalo, N. Y.



Steele Plant,  
Springfield, O.



Titusville Plant  
Titusville, Pa.



Southern Plant  
Birmingham, Ala.



Bond Plant, Buffalo, N. Y.



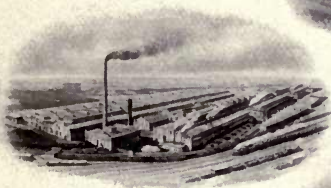
Brantford Plant,  
Brantford, Ont.



Michigan Plant,  
Detroit, Mich.



English Plant, Hull, Eng.



German Plant  
Schoenebeck, Ger.



French Plant  
Dole, France



French Plant  
Dole, France



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NOTE.—IDEAL Boilers are so designed that any casting, whether Round or Square, may be taken through any door or opening which is not less than 2 feet 6 inches wide.

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Special attention is directed to method of adjusting Sylphon Damper Regulators for Steam Boilers on page 253.

# Fuels and Capacities

The ratings for IDEAL Boilers are based on the use of hard coal, because the anthracite fuels have more uniform heat-making qualities than all other kinds.

No standard ratings can be made based on the soft or lignite fuels, because their heat-making values differ so widely. The heat-making value of anthracite coal averages about 12,000 British thermal units per pound, while some soft coals run as low as 9,000 B. t. u. per pound—some lignite fuels still lower. One cubic foot of hard coal weighs approximately 50 pounds, while a cubic foot of soft coal weighs approximately 40 pounds. Consequently any soft coal having a heat-making value equal to hard coal requires a Boiler with 25 per cent more coal-holding capacity to hold an equal weight of fuel. And when coal with a lower heat-making value is to be used, a Boiler having a fire-pot of correspondingly larger fuel-holding capacity should be selected.

Caking soft coals have a much higher heating power than coals which are free burning or non-caking. A table of heating values of various coals will be found on page 259.

## Rating Conditions

The ratings for IDEAL Boilers provide that all piping (mains and risers, flow and return), in addition to the direct radiation to be used, shall be figured as radiating surface in estimating the size of the Boiler required.

These ratings are for direct radiation. When any other heating surface than direct radiation is to be supplied, increased Boiler capacity must be figured according to the demand in each case.

In rating Steam Boilers as above, it is understood that an average pressure of 2 pounds will be maintained at the Boiler. In rating Water Boilers as above, it is understood that the temperature of the water leaving the Boiler will be 180 degrees Fahrenheit.

When a pipe-coil or cast-iron section is introduced into the fire-pot for the purpose of heating water for domestic use, additional capacity should be figured in determining size of Boiler—viz., in case of Steam Boilers,  $1\frac{1}{2}$  square feet of direct radiation for each gallon of water to be thus heated; and in the case of Water Boilers,  $2\frac{1}{2}$  square feet of direct radiation for each gallon of water to be thus heated, according to the capacity of the tank to which the coil or section is connected.

Best results are secured by an independent IDEAL Water Heater, which provides ample supply on every day of the year with trifling fuel expense.

## Guarantee and Coverings

These Boilers are guaranteed only to the extent of furnishing new castings for any found defective in manufacture. On account of the varying conditions surrounding their installation, we do not guarantee our Boilers otherwise.

Both on account of increased efficiency and greater economy, we recommend that all Boilers be thoroughly protected by a substantial covering of asbestos.

On page 131 tables will be found giving the amount of Asbestos Cement required to cover our IDEAL Boilers.

# Graded Ratings of Ideal Steam Boilers

One of most valuable features of the IDEAL line of Boilers is its wide range of capacities, which closely meet any specific need, in heating all kinds of buildings.

We here present graded lists of the ratings of IDEAL Boilers running from the lowest to the highest capacities, to enable the Heating Contractor to quickly locate the available patterns in the capacity desired.

The capacities of IDEAL Water Heaters are not included in these graded lists of ratings.

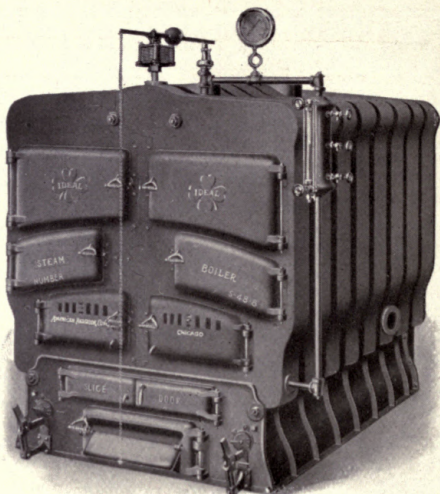
Ratings	Number	Name	Page	Ratings	Number	Name	Page
175	1015	Premier	36	850	3027	Premier	36
200	2015	Premier	36	900	S-19-7	Sectional	22
225	3015	Premier	36	900	2-28-S	Arco	30
275	1018	Premier	36	900	4027	Premier	36
275	1-19-S	Arco	32	1000	1-31-S	Arco	32
300	2018	Premier	36	1000	3-28-S	Arco	30
300	S-15-4	Sectional	24	1000	S-22-6	Sectional	20
325	3018	Premier	36	1100	S-25-5	Sectional	18
350	2-19-S	Arco	30	1200	S-22-7	Sectional	20
400	1021	Premier	36	1250	1-34-S	Arco	32
400	1-22-S	Arco	32	1275	2-31-S	Arco	30
400	3-19-S	Arco	30	1300	S-28-5	Sectional	16
425	2021	Premier	36	1350	S-25-6	Sectional	18
425	S-15-5	Sectional	24	1400	3-31-S	Arco	30
450	3021	Premier	36	1500	2-34-S	Arco	30
475	4021	Premier	36	1600	S-25-7	Sectional	18
500	1-25-S	Arco	32	1625	S-28-6	Sectional	16
525	1024	Premier	36	1650	3-34-S	Arco	30
525	2-22-S	Arco	30	1850	S-25-8	Sectional	18
550	S-15-6	Sectional	24	1950	S-28-7	Sectional	16
575	3-22-S	Arco	30	2100	S-36-5	Sectional	14
575	2024	Premier	36	2275	S-28-8	Sectional	16
600	S-19-5	Sectional	22	2625	S-36-6	Sectional	14
625	3024	Premier	36	3150	S-36-7	Sectional	14
625	2-25-S	Arco	30	3675	S-36-8	Sectional	14
650	4024	Premier	36	4200	S-36-9	Sectional	14
700	3-25-S	Arco	30	4750	S-48-6	Sectional	12
750	1027	Premier	36	5700	S-48-7	Sectional	12
750	S-19-6	Sectional	22	6650	S-48-8	Sectional	12
800	2027	Premier	36	7600	S-48-9	Sectional	12
800	1-28-S	Arco	32	8550	S-48-10	Sectional	12
800	S-22-5	Sectional	20				



# Graded Ratings of Ideal Water Boilers

Ratings	Number	Name	Page	Ratings	Number	Name	Page
300	1115	Premier	37	1325	2127	Premier	37
325	2115	Premier	37	1325	1-28-W	Arco	33
350	3115	Premier	37	1350	25-4-W	Standard	28
350	15-1-W	Standard	28	1400	3127	Premier	37
375	17-1-W	Standard	28	1400	28-2-W	Standard	28
425	17-2-W	Standard	28	1425	31-1-W	Standard	28
450	1118	Premier	37	1475	4127	Premier	37
450	1-19-W	Arco	33	1500	2-28-W	Arco	31
475	17-3-W	Standard	28	1500	W-19-7	Sectional	23
500	2118	Premier	37	1500	28-3-W	Standard	28
500	W-15-4	Sectional	25	1575	31-2-W	Standard	28
550	3118	Premier	37	1600	28-4-W	Standard	28
550	19-1-W	Standard	28	1650	1-31-W	Arco	33
575	2-19-W	Arco	31	1650	3-28-W	Arco	31
600	1121	Premier	37	1650	W-22-6	Sectional	21
650	2121	Premier	37	1750	31-3-W	Standard	28
650	1-22-W	Arco	33	1825	W-25-5	Sectional	19
650	3-19-W	Arco	31	1900	31-4-W	Standard	28
650	19-2-W	Standard	28	2000	W-22-7	Sectional	21
700	W-15-5	Sectional	25	2000	34-1-W	Standard	28
700	3121	Premier	37	2075	1-34-W	Arco	33
725	22-1-W	Standard	28	2100	2-31-W	Arco	31
750	4121	Premier	37	2150	W-28-5	Sectional	17
750	19-3-W	Standard	28	2175	34-2-W	Standard	28
800	22-2-W	Standard	28	2225	W-25-6	Sectional	19
825	1-25-W	Arco	33	2325	3-31-W	Arco	31
875	1124	Premier	37	2350	34-3-W	Standard	28
875	2-22-W	Arco	31	2475	2-34-W	Arco	31
875	22-3-W	Standard	28	2500	34-4-W	Standard	28
900	W-15-6	Sectional	25	2650	W-25-7	Sectional	19
950	3-22-W	Arco	31	2675	W-28-6	Sectional	17
950	22-4-W	Standard	28	2725	3-34-W	Arco	31
950	2124	Premier	37	3050	W-25-8	Sectional	19
1000	W-19-5	Sectional	23	3200	W-28-7	Sectional	17
1025	3124	Premier	37	3450	W-36-5	Sectional	15
1025	2-25-W	Arco	31	3725	W-28-8	Sectional	17
1025	25-1-W	Standard	28	4325	W-36-6	Sectional	15
1075	4124	Premier	37	5200	W-36-7	Sectional	15
1150	3-25-W	Arco	31	6050	W-36-8	Sectional	15
1150	25-2-W	Standard	28	6925	W-36-9	Sectional	15
1250	1127	Premier	37	7825	W-48-6	Sectional	13
1250	W-19-6	Sectional	23	9400	W-48-7	Sectional	13
1250	25-3-W	Standard	28	10975	W-48-8	Sectional	13
1300	W-22-5	Sectional	21	12550	W-48-9	Sectional	13
1300	28-1-W	Standard	28	14125	W-48-10	Sectional	13

# Ideal Sectional 48-inch Steam Boilers



No. S-48-8 Boiler (Patented)

No. Including Sec.	Length Total Inches	Grate Area Sq. Ft.	Average Firepot Sq. Ft.	Out-lets In.	Ash-Pit (Inside) Inches	*Ra-tings	List Price Complete
S-48-6	92	18.00	18.75	2-6	50 $\frac{3}{4}$ x 58 $\frac{1}{8}$	4750	\$1294.00
S-48-7	102 $\frac{3}{4}$	21.60	22.50	2-6	50 $\frac{3}{4}$ x 68 $\frac{1}{8}$	5700	1484.00
S-48-8	114	25.20	26.25	3-6	50 $\frac{3}{4}$ x 79 $\frac{1}{8}$	6650	1674.00
S-48-9	124 $\frac{1}{4}$	28.80	30.00	3-6	50 $\frac{3}{4}$ x 89 $\frac{1}{8}$	7600	1864.00
S-48-10	135	32.40	33.75	3-6	50 $\frac{3}{4}$ x 100 $\frac{1}{2}$	8550	2054.00

Height of Boilers, inclusive of trimmings .....97 inches  
 Width of Boilers, inclusive of trimmings .....80 inches  
 Height of Water Line .....70 inches  
 Size of Smoke-Pipe .....21 inches

For additional details of measurements, see pages 26 and 27.

48-inch Steam Boilers are furnished with four 4-inch return tapplings, two on the face of back section, and one on each side of Boiler in third section from rear. Back openings should be yoked together so that both halves of Boiler may be drained equally.

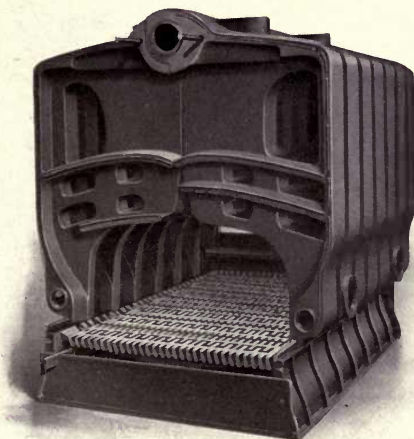
Do not bush flow-pipe outlets—connect all of them full size to the main.

For Price List of Boiler parts, see pages 186 to 205, inclusive.

\* For Fuels and Ratings, see page 9.

# Ideal Sectional 48-inch Water Boilers

(Patented)



Rear Erecting View, No. W-48-8 Boiler

No. Including Sec.	Length Total Inches	Grate Area Sq. Ft.	Average Fire pot Sq. Ft.	Out-lets In.	Ash-Pit (Inside) Inches	*Ratings	List Price Complete
W-48-6	92	18.00	18.75	2-6	50 $\frac{3}{4}$ x 58 $\frac{1}{8}$	7825	\$1274.00
W-48-7	102 $\frac{3}{4}$	21.60	22.50	2-6	50 $\frac{3}{4}$ x 68 $\frac{1}{8}$	9400	1464.00
W-48-8	114	25.20	26.25	3-6	50 $\frac{3}{4}$ x 79 $\frac{1}{8}$	10975	1654.00
W-48-9	124 $\frac{1}{4}$	28.80	30.00	3-6	50 $\frac{3}{4}$ x 89 $\frac{1}{8}$	12550	1844.00
W-48-10	135	32.40	33.75	3-6	50 $\frac{3}{4}$ x 100 $\frac{1}{2}$	14125	2034.00

Total Height of Boilers .....81 $\frac{3}{4}$  inches  
 Total Width of Boilers .....68 inches  
 Size of Smoke-Pipe .....21 inches

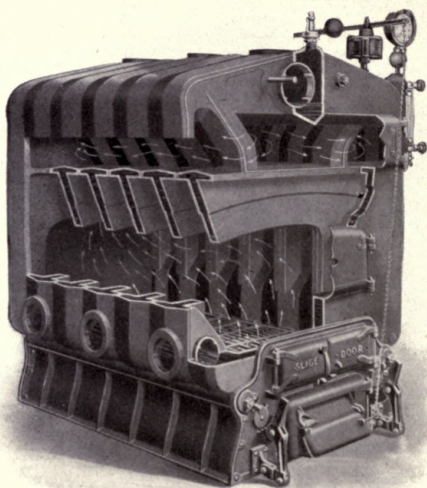
For additional details of measurements, see pages 26 and 27.

48-inch Water Boilers are furnished with four 6-inch return tapplings, two on face of back section, and one on each side of Boiler in second section from rear. Back openings should be yoked together so that both halves of Boiler may be drained equally.

For Price List of Boiler parts, see pages 186 to 205, inclusive.

\* For Fuels and Ratings, see page 9.

# Ideal Sectional 36-inch Steam Boilers



No. S-36-7 Boiler

No. Including Sec.	Length Total Inches	Grate Area Sq. Ft.	Average Fire pot Sq. Ft.	Out-lets In.	Ash-Pit (Inside) Inches	* Ratings	List Price Complete
S-36-5	69¾	9.12	10.40	2-5	38½ x 40¾	2100	\$ 730.00
S-36-6	78¾	11.40	13.00	2-5	38½ x 49¾	2625	845.00
S-36-7	88	13.68	15.60	3-5	38½ x 59	3150	960.00
S-36-8	97½	15.96	18.20	3-5	38½ x 68½	3675	1075.00
S-36-9	106¾	18.24	20.80	4-5	38½ x 77¾	4200	1190.00

Height of Boilers, inclusive of trimmings ..... 76¼ inches  
 Width of Boilers, inclusive of trimmings ..... 60 inches  
 Height of Water Line ..... 60½ inches  
 Size of Smoke-Pipe ..... 15 inches

For additional measurements, see pages 26 and 27.

For each supply outlet on top of Boiler there is a corresponding return inlet in either side. Do not bush flow-pipe outlets—connect all of them full size to the main.

For Price List of Boiler parts, see pages 186 to 205 inclusive.

\* For Fuels and Ratings, see page 9.

# Ideal Sectional 36-inch Water Boilers



No. W-36-7 Boiler

No. Including Sec.	Length Total Inches	Grate Area Sq. Ft.	Average Firepot Sq. Ft.	Outlets In.	Ash-Pit (Inside) Inches	*Ratings	List Price Complete
W-36-5	69¾	9.12	10.40	2-5	38½ x 40¾	3450	\$ 710.00
W-36-6	78¾	11.40	13.00	2-5	38½ x 49¾	4325	825.00
W-36-7	88	13.68	15.60	3-5	38½ x 59	5200	940.00
W-36-8	97½	15.96	18.20	3-5	38½ x 68½	6050	1055.00
W-36-9	106¼	18.24	20.80	4-5	38½ x 77¼	6925	1170.00

Total Height .....70 inches  
Total Width.....53¼ inches  
Size of Smoke-Pipe.....15 inches

For additional measurements, see pages 26 and 27.

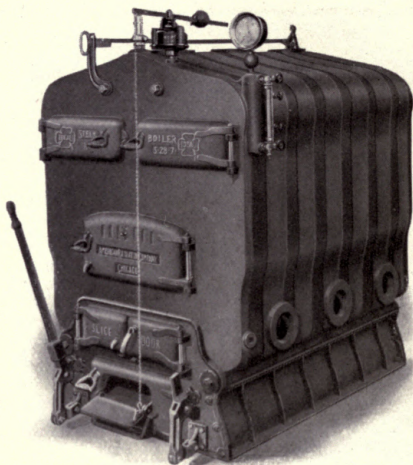
For each supply outlet on top of Boiler there is a corresponding return inlet in either side.

For Price List of Boiler parts, see pages 186 to 205, inclusive.

\* For Fuels and Ratings, see page 9.



# Ideal Sectional 28-inch Steam Boilers



No. S-28-7 Boiler

No. Including Sec.	Length Total Inches	Grate Area Sq. Ft.	Average Firepot Sq. Ft.	Outlets In.	Ash-Pit (Inside) Inches	*Ratings	List Price Complete
S-28-5	60	6.24	7.33	2-4	30 $\frac{5}{8}$ x 35 $\frac{1}{2}$	1300	\$490.00
S-28-6	68	7.80	9.16	2-4	30 $\frac{5}{8}$ x 43 $\frac{1}{2}$	1625	587.00
S-28-7	76	9.36	10.99	3-4	30 $\frac{5}{8}$ x 51 $\frac{1}{2}$	1950	684.00
S-28-8	84	10.92	12.83	3-4	30 $\frac{5}{8}$ x 59 $\frac{1}{2}$	2275	781.00

Height of Boilers, inclusive of trimmings .....67 $\frac{1}{8}$  inches  
 Width of Boilers, inclusive of trimmings .....50 $\frac{1}{2}$  inches  
 Height of Water Line ..... 51 $\frac{3}{8}$  inches  
 Size of Smoke-Pipe .....12 inches

For Wood Burning. On special order these Boilers are fitted with 12 $\frac{7}{8}$ - x 20-inch fire-door opening and special grates.

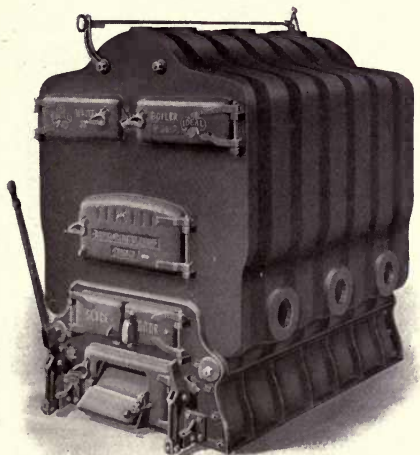
For additional measurements, see pages 26 and 27.

For each supply outlet on top of Boiler there is a corresponding return inlet in either side. Do not bush flow-pipe outlets—connect all of them full size to the main.

For Price List of Boiler parts, see pages 186 to 205, inclusive.

\* For Fuels and Ratings, see page 9.

# Ideal Sectional 28-inch Water Boilers



No. W-28-7 Boiler

No. Including Sec.	Length Total Inches	Grate Area Sq. Ft.	Average Firepot Sq. Ft.	Out-lets In.	Ash-Pit (Inside) Inches	*Ratings	List Price Complete
W-28-5	60	6.24	7.33	2-4	30 $\frac{5}{8}$ x 35 $\frac{1}{2}$	2150	\$480.00
W-28-6	68	7.80	9.16	2-4	30 $\frac{5}{8}$ x 43 $\frac{1}{2}$	2675	577.00
W-28-7	76	9.36	10.99	3-4	30 $\frac{5}{8}$ x 51 $\frac{1}{2}$	3200	674.00
W-28-8	84	10.92	12.83	3-4	30 $\frac{5}{8}$ x 59 $\frac{1}{2}$	3725	761.00

Total Height .....60 $\frac{5}{8}$  inches  
 Total Width.....44 inches  
 Size of Smoke-Pipe.....12 inches

For Wood Burning. On special order these Boilers are fitted with 12 $\frac{7}{8}$ -x 20-inch fire-door opening and special grates.

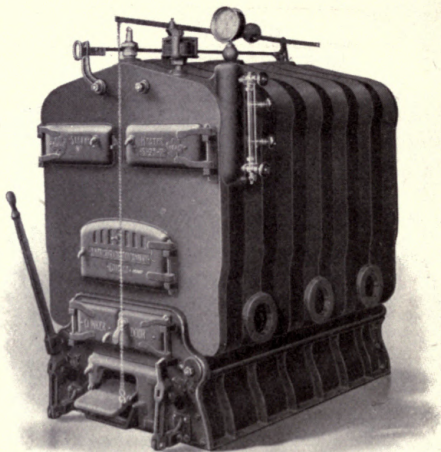
For each supply outlet on top of Boiler there is a corresponding return inlet in either side.

For additional measurements, see pages 26 and 27.

For Price List of Boiler parts, see pages 186 to 205, inclusive.

\* For Fuels and Ratings, see page 9.

# Ideal Sectional 25-inch Steam Boilers



No. S-25-7 Boiler

No. Including Sec.	Length Total Inches	Grate Area Sq. Ft.	Average Firepot Sq. Ft.	Outlets In.	Ash-Pit (Inside) Inches	*Ratings	List Price Complete
S-25-5	59¼	5.44	6.48	2-4	28 x 35 <sup>3</sup> / <sub>16</sub>	1100	\$430.00
S-25-6	66 <sup>7</sup> / <sub>8</sub>	6.80	8.10	2-4	28 x 42 <sup>7</sup> / <sub>8</sub>	1350	505.00
S-25-7	74½	8.16	9.72	3-4	28 x 50 <sup>9</sup> / <sub>16</sub>	1600	580.00
S-25-8	82¼	9.52	11.34	3-4	28 x 58½	1850	655.00

Height of Boilers, inclusive of trimmings .....64<sup>1</sup>/<sub>8</sub> inches  
Width of Boilers, inclusive of trimmings .....47<sup>1</sup>/<sub>4</sub> inches  
Height of Water Line.....49 inches  
Size of Smoke-Pipe.....11 inches

For Wood Burning. On special orders these Boilers are fitted with 11½- x 18-inch fire-door opening and special grates.

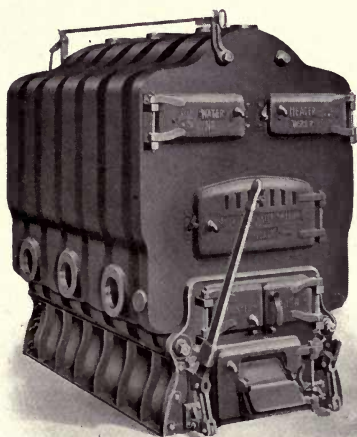
For additional measurements, see pages 26 and 27.

For each supply outlet on top of Boiler there is a corresponding return inlet in either side. Do not bush flow-pipe outlets—connect all of them full size to the main.

For Price List of Boiler parts, see pages 186 to 205, inclusive.

\* For Fuels and Ratings, see page 9.

# Ideal Sectional 25-inch Water Boilers



No. W-25-7 Boiler

No. Including Sec.	Length Total Inches	Grate Area Sq. Ft.	Average Firepot Sq. Ft.	Outlets In.	Ash-Pit (Inside) Inches	*Ratings	List Price Complete
W-25-5	59 $\frac{1}{4}$	5.44	6.48	2-4	28 x 35 $\frac{3}{4}$	1825	\$420.00
W-25-6	66 $\frac{3}{8}$	6.80	8.10	2-4	28 x 42 $\frac{3}{8}$	2225	495.00
W-25-7	74 $\frac{1}{2}$	8.16	9.72	3-4	28 x 50 $\frac{1}{8}$	2650	570.00
W-25-8	82 $\frac{1}{4}$	9.52	11.34	3-4	28 x 58 $\frac{1}{4}$	3050	645.00

Total Height .....57 $\frac{7}{8}$  inches  
 Total Width .....40 $\frac{3}{8}$  inches  
 Size of Smoke-Pipe.....11 inches

For Wood Burning. On special orders these Boilers are fitted with 11 $\frac{1}{8}$ -x 18-inch fire-door opening and special grates.

For additional measurements, see pages 26 and 27.

For each supply outlet on top of Boiler there is a corresponding return inlet in either side.

For Price List of Boiler parts, see pages 186 to 205, inclusive.

\* For Fuels and Ratings, see page 9.

# Ideal Sectional 22-inch Steam Boilers



No. S-22-7 Boiler

No. Including Sec.	Length Total Inches	Grate Area Sq. Ft.	Average Firepot Sq. Ft.	Out-lets In.	Ash-Pit (Inside) Inches	*Ra-tings	List Price Complete
S-22-5	53 $\frac{3}{4}$	4.08	4.84	2-4	23 $\frac{1}{8}$ x 31 $\frac{1}{8}$	800	\$340.00
S-22-6	60 $\frac{3}{4}$	5.10	6.05	2-4	23 $\frac{1}{8}$ x 38 $\frac{3}{8}$	1000	400.00
S-22-7	67 $\frac{3}{4}$	6.12	7.26	3-4	23 $\frac{1}{8}$ x 45 $\frac{1}{8}$	1200	460.00

Height of Boilers, inclusive of trimmings ..... 59 $\frac{1}{2}$  inches  
 Width of Boilers, inclusive of trimmings ..... 42 inches  
 Height of Water Line ..... 44 $\frac{3}{4}$  inches  
 Size of Smoke-Pipe ..... 10 inches

For Wood Burning. On special orders these Boilers are fitted with 11 $\frac{1}{8}$ -x 18-inch fire-door opening and special grates.

For additional measurements, see pages 26 and 27.

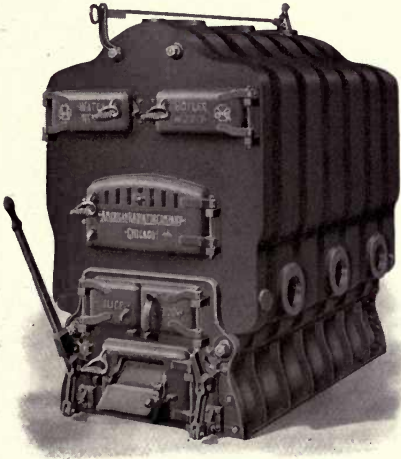
For each supply outlet on top of Boiler there is a corresponding return inlet in either side. Do not bush flow-pipe outlets—connect all of them full size to the main.

For Price List of Boiler parts, see pages 186 to 205, inclusive.

\* For Fuels and Ratings, see page 9.



# Ideal Sectional 22-inch Water Boilers



No. W-22-7 Boiler

No. Including Sec.	Length Total Inches	Grate Area Sq. Ft.	Average Firepot Sq. Ft.	Outlets In.	Ash-Pit (Inside) Inches	*Ratings	List Price Complete
W-22-5	53¼	4.08	4.84	2-4	23⅛ x 31⅛	1300	\$330.00
W-22-6	60¼	5.10	6.05	2-4	23⅛ x 38⅞	1650	390.00
W-22-7	67¼	6.12	7.26	3-4	23⅛ x 45⅛	2000	450.00

Total Height .....	52¼ inches
Total Width .....	36 inches
Size of Smoke-Pipe .....	10 inches

For Wood Burning. On special orders these Boilers are fitted with 11⅛- x 18-inch fire-door and special grates.

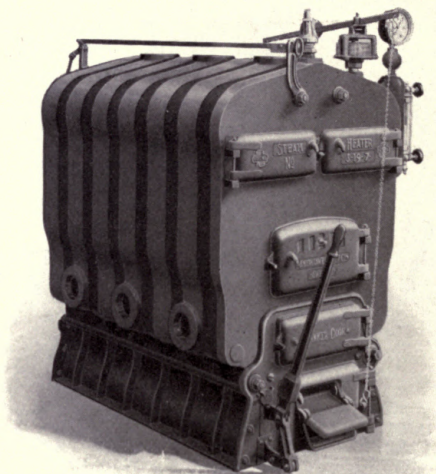
For additional measurements, see pages 26 and 27.

For each supply outlet on top of Boiler there is a corresponding return inlet in either side.

For Price List of Boiler parts, see pages 186 to 205, inclusive.

\* For Fuels and Ratings, see page 9.

# Ideal Sectional 19-inch Steam Boilers



No. S-19-7 Boiler

No. Including Sec.	Length Total Inches	Grate Area Sq. Ft.	Average Firepot Sq. Ft.	Outlets In.	Ash-Pit (Inside) Inches	*Ratings	List Price Complete
S-19-5	52 $\frac{3}{4}$	3.32	4.00	2-3	20 x 29 $\frac{1}{8}$	600	\$259.00
S-19-6	58 $\frac{3}{8}$	4.15	5.00	2-3	20 x 36 $\frac{3}{8}$	750	325.00
S-19-7	65	4.98	6.00	3-3	20 x 43 $\frac{5}{8}$	900	370.00

Height of Boilers, inclusive of trimmings .....55 $\frac{1}{4}$  inches  
 Width of Boilers, inclusive of trimmings .....38 inches  
 Height of Water Line .....42 $\frac{1}{8}$  inches  
 Size of Smoke-Pipe ..... 9 inches

For Wood Burning. On special orders these Boilers are fitted with 10 $\frac{1}{4}$ - x 18-inch fire-door opening and special grates.

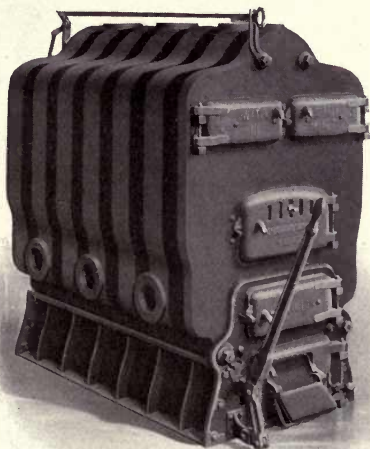
For additional measurements, see pages 26 and 27.

For each supply outlet on top of Boiler there is a corresponding return inlet in either side. Do not bush flow-pipe outlets—connect all of them full size to the main.

For Price List of Boiler parts, see pages 186 to 205, inclusive.

\* For Fuels and Ratings, see page 9.

# Ideal Sectional 19-inch Water Boilers



No. W-19-7 Boiler

No. Including Sec.	Length Total Inches	Grate Area Sq. Ft.	Average Firepot Sq. Ft.	Out-lets In.	Ash-Pit (Inside) Inches	*Ratings	List Price Complete
W-19-5	52 $\frac{3}{4}$	3.32	4.00	2-3	20 x 29 $\frac{1}{8}$	1000	\$249.00
W-19-6	58 $\frac{3}{8}$	4.15	5.00	2-3	20 x 36 $\frac{5}{8}$	1250	315.00
W-19-7	65	4.98	6.00	3-3	20 x 43 $\frac{5}{8}$	1500	360.00

Total Height ..... 50 inches  
 Total Width ..... 31 $\frac{1}{4}$  inches  
 Size of Smoke-Pipe ..... 9 inches

For Wood Burning. On special orders these Boilers are fitted with 10 $\frac{1}{4}$ -x 18-inch fire-door opening and special grates.

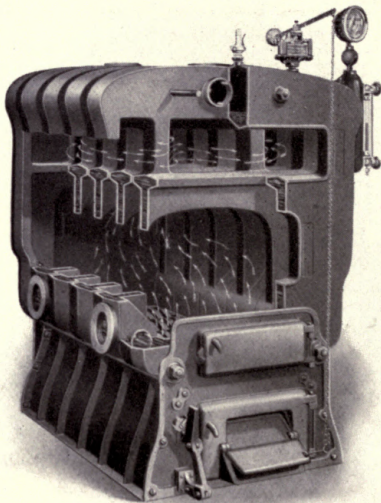
For additional measurements, see pages 26 and 27.

For each supply outlet on top of Boiler there is a corresponding return inlet in either side.

For Price List of Boiler parts, see pages 186 to 205, inclusive.

\* For Fuels and Ratings, see page 9.

# Ideal Sectional 15-inch Steam Boilers



No. S-15-6 Boiler

No. Including Sec.	Length Total Inches	Grate Area Sq. Ft.	Average Firepot Sq. Ft.	Outlets In.	Ash-Pit (Inside) Inches	*Ratings	List Price Complete
S-15-4	40 <sup>7</sup> / <sub>8</sub>	1.95	2.47	2-3	20 <sup>1</sup> / <sub>8</sub> x 21 <sup>5</sup> / <sub>8</sub>	300	\$157.00
S-15-5	47 <sup>1</sup> / <sub>8</sub>	2.60	3.30	2-3	20 <sup>1</sup> / <sub>8</sub> x 27 <sup>1</sup> / <sub>8</sub>	425	210.00
S-15-6	53 <sup>3</sup> / <sub>8</sub>	3.25	4.10	2-3	20 <sup>1</sup> / <sub>8</sub> x 34	550	245.00

Height of Boilers, inclusive of trimmings .....53<sup>1</sup>/<sub>2</sub> inches  
Width of Boilers, inclusive of trimmings .....34<sup>1</sup>/<sub>2</sub> inches  
Height of Water Line .....38<sup>7</sup>/<sub>8</sub> inches  
Size of Smoke-Pipe.....8 inches

For each supply outlet on top of Boiler there is a corresponding return inlet in either side. Do not bush flow-pipe outlets—connect all of them full size to the main.

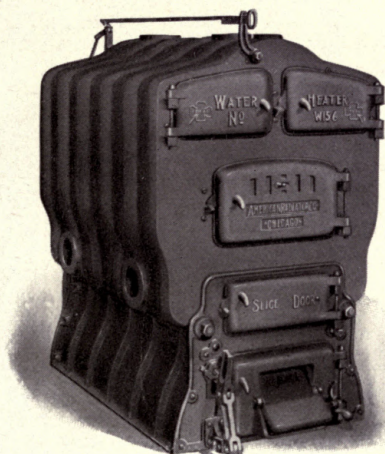
For additional data, see pages 26 and 27.

For Price List of Boiler parts, see pages 186 to 205, inclusive.

\* For Fuels and Ratings, see page 9.



# Ideal Sectional 15-inch Water Boilers



No. W-15-6 Boiler

No. Including Sec.	Length Total Inches	Grate Area Sq. Ft.	Average Firepot Sq. Ft.	Outlets In.	Ash-Pit (Inside) Inches	*Ratings	List Price Complete
W-15-4	40 $\frac{7}{8}$	1.95	2.47	2-3	20 $\frac{1}{8}$ x 21 $\frac{5}{8}$	500	\$147.00
W-15-5	47 $\frac{1}{8}$	2.60	3.30	2-3	20 $\frac{1}{8}$ x 27 $\frac{1}{8}$	700	200.00
W-15-6	53 $\frac{3}{8}$	3.25	4.10	2-3	20 $\frac{1}{8}$ x 34	900	235.00

Total Height ..... 42 $\frac{1}{2}$  inches  
 Total Width ..... 27 $\frac{1}{2}$  inches  
 Size of Smoke-Pipe ..... 8 inches

For each supply outlet on top of Boiler there is a corresponding return inlet in either side.

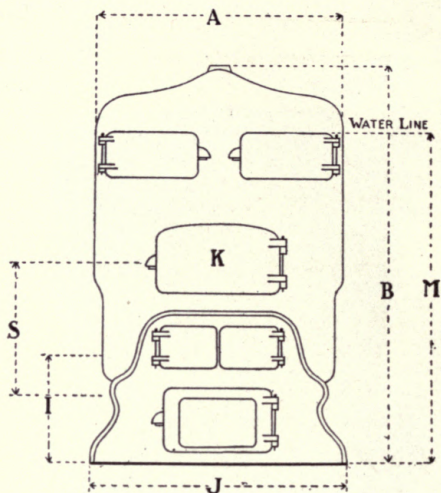
For additional data, see pages 26 and 27.

For Price List of Boiler parts, see pages 186 to 205 inclusive.

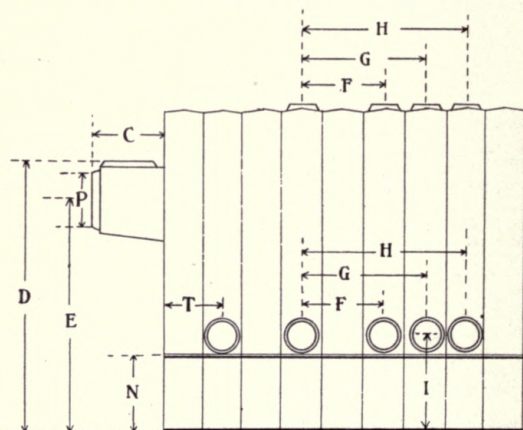
\* For Fuels and Ratings, see page 9.



# Sectional Boiler Measurements



Front View



Sectional View

For details of measurements see page 27.

# Sectional Boiler Measurements

Table of distances between points as noted upon the outline drawings of IDEAL Sectional Boilers shown on page 26. These measurements are all given in inches.

	15-in. Boilers		19-in. Boilers		22-in. Boilers		25-in. Boilers		28-in. Boilers		36-in. Boilers		48-in. Boilers	
	Water	Steam	Water	Steam	Water	Steam	Water	Steam	Water	Steam	Water	Steam	Water	Steam
A.....	27½	28½	31¼	32½	36¾	41¾	40¾	41¾	44½	44½	53¼	54¼	68	69
B.....	42⅞	46⅞	50	50	52¼	57¾	57¾	57¾	60¾	60¾	69½	69½	81¾	81¾
†C.....	13⅞	13⅞	15½	15½	15½	17½	17½	17½	18½	18½	21½	21½	27¼	27¼
†D.....	41⅞	41⅞	45½	45½	47¾	53	53	53	55½	55½	63¾	63¾	73¾	73¾
E.....	34¾	34¾	37¾	37¾	40½	44½	44½	44½	46¼	46¼	52½	52½	59½	59½
F.....	12½	12½	13¼	13¼	14½	15¾	15¾	15¾	16	16	18¼	18¼	21½	21½
G.....	18¾	18¾	19¾	19¾	21¼	23½	23½	23½	24	24	27¾	27¾	32¼	32¼
H.....	25	25	26½	26½	28¾	30¾	30¾	30¾	32	32	36½	36½	43	43
I.....	16⅞	16⅞	16	16	16¾	17¾	17¾	17¾	17¾	17¾	18⅞	18⅞	22¾	22¾
J.....	23¾	23¾	26	26	29½	30¾	30¾	30¾	37½	37½	45⅞	45⅞	58¾	58¾
K.....	8x14	8x14	\$8x14	\$8x14	\$8x14	\$9x18	\$9x18	\$9x18	\$9x18	\$9x18	10x20	10x20	11x19	11x19
M.....	.....	38⅞	.....	42½	44¾	49	.....	49	.....	.....	.....	60½	.....	70
N.....	11¾	11¾	9¾	9¾	9¾	9¾	9¾	9¾	10	10	10⅞	10⅞	14½	14½
P.....	8	8	9	9	10	11	11	11	12	12	15	15	21	21
S.....	13¼	13¼	13¼	13¼	14½	15	15	15	16	16	18⅞	18⅞	17¾	17¾
T.....	7½	7½	8	8	8½	9½	9½	9½	9½	9½	10¾	10¾	12¾	.....

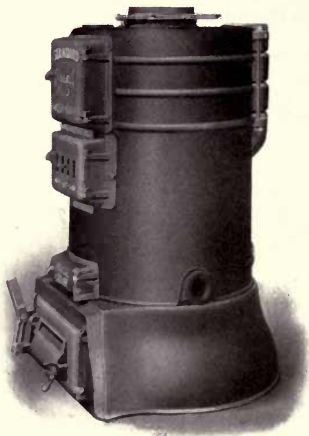
† Measured without Smoke-Hood Cover.

‡ Measured with Smoke-Hood Cover on.

§ For Wood, Feed Door K in 19-inch Boilers is 10¼ x 18 inches; in 22-inch Boilers is 11½ x 18 inches; in 25-inch Boilers is 11½ x 18 inches; in 28-inch Boilers, 12⅞ x 20 inches.

Do not bush the flow-pipe outlets of Steam Boilers; connect all of them full size to the main.

# Ideal Standard Water Boilers



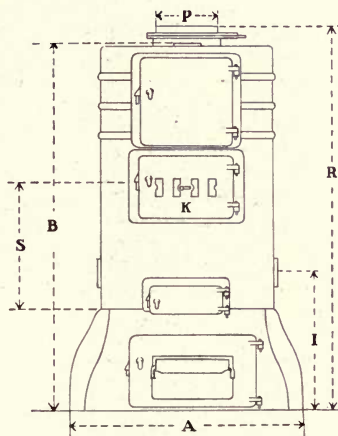
No. 25-3-W Boiler

No.	Heights to Top Outlet Inches	Diam. of Base Inches	Nom. Diam. Grate Inches	Outlet and Inlet Inches	Smoke Pipe Inches	* Ra- tings	List Prices
15-1-W	43 $\frac{3}{8}$	27 $\frac{3}{8}$	15	1-3	7	350	\$101.00
17-1-W	41 $\frac{1}{4}$	28 $\frac{3}{4}$	17	1-3	7	375	105.00
17-2-W	45 $\frac{1}{4}$	28 $\frac{3}{4}$	17	1-3	7	425	123.00
17-3-W	49 $\frac{1}{4}$	28 $\frac{3}{4}$	17	1-3	7	475	136.00
19-1-W	42	30 $\frac{1}{2}$	19	1-3	8	550	153.50
19-2-W	46	30 $\frac{1}{2}$	19	1-3	8	650	184.00
19-3-W	50	30 $\frac{1}{2}$	19	1-3	8	750	197.00
22-1-W	44	35	22	1-4	9	725	194.00
22-2-W	48 $\frac{1}{2}$	35	22	1-4	9	800	201.00
22-3-W	53	35	22	1-4	9	875	217.50
22-4-W	57 $\frac{1}{2}$	35	22	1-4	9	950	230.00
25-1-W	45	38	25	1-4	10	1025	270.00
25-2-W	49 $\frac{1}{2}$	38	25	1-4	10	1150	290.00
25-3-W	54	38	25	1-4	10	1250	307.00
25-4-W	58 $\frac{1}{2}$	38	25	1-4	10	1350	325.00
28-1-W	47	41 $\frac{3}{8}$	28	1-5	11	1300	318.00
28-2-W	52	41 $\frac{3}{8}$	28	1-5	11	1400	336.00
28-3-W	57	41 $\frac{3}{8}$	28	1-5	11	1500	350.00
28-4-W	62	41 $\frac{3}{8}$	28	1-5	11	1600	372.50
31-1-W	48	44 $\frac{1}{8}$	31	1-5	12	1425	340.00
31-2-W	53	44 $\frac{1}{8}$	31	1-5	12	1575	365.00
31-3-W	58	44 $\frac{1}{8}$	31	1-5	12	1750	398.00
31-4-W	63	44 $\frac{1}{8}$	31	1-5	12	1900	424.00
34-1-W	49	48 $\frac{1}{8}$	34	1-6	13	2000	438.00
34-2-W	54	48 $\frac{1}{8}$	34	1-6	13	2175	472.00
34-3-W	59	48 $\frac{1}{8}$	34	1-6	13	2350	501.50
34-4-W	64	48 $\frac{1}{8}$	34	1-6	13	2500	530.50

For Price List of Boiler parts, see pages 186 to 205, inclusive.

\* For Fuels and Ratings, see page 9.

# Standard Water Boiler Measurements



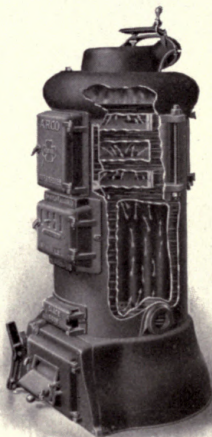
No.	A	B	I	K	P	R	S
15-1-W	27 $\frac{3}{8}$	43 $\frac{5}{8}$	15 $\frac{1}{2}$	8 $\frac{1}{2}$ x 11 $\frac{3}{4}$	7	46 $\frac{1}{8}$	19 $\frac{1}{8}$
17-1-W	28 $\frac{3}{4}$	41 $\frac{1}{4}$	15 $\frac{7}{8}$	8 $\frac{1}{2}$ x 11 $\frac{3}{4}$	7	43 $\frac{3}{4}$	21 $\frac{7}{8}$
17-2-W	28 $\frac{3}{4}$	45 $\frac{1}{4}$	15 $\frac{7}{8}$	8 $\frac{1}{2}$ x 11 $\frac{3}{4}$	7	47 $\frac{3}{4}$	21 $\frac{7}{8}$
17-3-W	28 $\frac{3}{4}$	49 $\frac{1}{4}$	15 $\frac{7}{8}$	8 $\frac{1}{2}$ x 11 $\frac{3}{4}$	7	51 $\frac{3}{4}$	21 $\frac{7}{8}$
19-1-W	30 $\frac{1}{2}$	42	15 $\frac{7}{8}$	8 $\frac{1}{2}$ x 11 $\frac{3}{4}$	8	44 $\frac{1}{2}$	24 $\frac{1}{8}$
19-2-W	30 $\frac{1}{2}$	46	15 $\frac{7}{8}$	8 $\frac{1}{2}$ x 11 $\frac{3}{4}$	8	48 $\frac{1}{2}$	24 $\frac{1}{8}$
19-3-W	30 $\frac{1}{2}$	50	15 $\frac{7}{8}$	8 $\frac{1}{2}$ x 11 $\frac{3}{4}$	8	52 $\frac{1}{2}$	24 $\frac{1}{8}$
22-1-W	35	44	17	9 $\frac{1}{4}$ x 13 $\frac{1}{4}$	9	46 $\frac{1}{2}$	27
22-2-W	35	48 $\frac{1}{2}$	17	9 $\frac{1}{4}$ x 13 $\frac{1}{4}$	9	51	27
22-3-W	35	53	17	9 $\frac{1}{4}$ x 13 $\frac{1}{4}$	9	55 $\frac{1}{2}$	27
22-4-W	35	57 $\frac{1}{2}$	17	9 $\frac{1}{4}$ x 13 $\frac{1}{4}$	9	60	27
25-1-W	38	45	17 $\frac{1}{2}$	9 $\frac{1}{4}$ x 13 $\frac{1}{4}$	10	48	30 $\frac{1}{8}$
25-2-W	38	49 $\frac{1}{2}$	17 $\frac{1}{2}$	9 $\frac{1}{4}$ x 13 $\frac{1}{4}$	10	52 $\frac{1}{2}$	30 $\frac{1}{8}$
25-3-W	38	54	17 $\frac{1}{2}$	9 $\frac{1}{4}$ x 13 $\frac{1}{4}$	10	57	30 $\frac{1}{8}$
25-4-W	38	58 $\frac{1}{2}$	17 $\frac{1}{2}$	9 $\frac{1}{4}$ x 13 $\frac{1}{4}$	10	61 $\frac{1}{2}$	30 $\frac{1}{8}$
28-1-W	41 $\frac{3}{8}$	47	18 $\frac{1}{8}$	9 $\frac{1}{8}$ x 16	11	50	33 $\frac{3}{8}$
28-2-W	41 $\frac{3}{8}$	52	18 $\frac{1}{8}$	9 $\frac{1}{8}$ x 16	11	55	33 $\frac{3}{8}$
28-3-W	41 $\frac{3}{8}$	57	18 $\frac{1}{8}$	9 $\frac{1}{8}$ x 16	11	60	33 $\frac{3}{8}$
28-4-W	41 $\frac{3}{8}$	62	18 $\frac{1}{8}$	9 $\frac{1}{8}$ x 16	11	65	33 $\frac{3}{8}$
31-1-W	44 $\frac{1}{8}$	48	18 $\frac{3}{8}$	9 $\frac{1}{8}$ x 16	12	51	36 $\frac{1}{4}$
31-2-W	44 $\frac{1}{8}$	53	18 $\frac{3}{8}$	9 $\frac{1}{8}$ x 16	12	56	36 $\frac{1}{4}$
31-3-W	44 $\frac{1}{8}$	58	18 $\frac{3}{8}$	9 $\frac{1}{8}$ x 16	12	61	36 $\frac{1}{4}$
31-4-W	44 $\frac{1}{8}$	63	18 $\frac{3}{8}$	9 $\frac{1}{8}$ x 16	12	66	36 $\frac{1}{4}$
34-1-W	48 $\frac{1}{8}$	49	19 $\frac{1}{4}$	9 $\frac{1}{8}$ x 16	13	52	39 $\frac{1}{8}$
34-2-W	48 $\frac{1}{8}$	54	19 $\frac{1}{4}$	9 $\frac{1}{8}$ x 16	13	57	39 $\frac{1}{8}$
34-3-W	48 $\frac{1}{8}$	59	19 $\frac{1}{4}$	9 $\frac{1}{8}$ x 16	13	62	39 $\frac{1}{8}$
34-4-W	48 $\frac{1}{8}$	64	19 $\frac{1}{4}$	9 $\frac{1}{8}$ x 16	13	67	39 $\frac{1}{8}$

See page 38 for distances between centers of outlets and inlets.

NOTE.—IDEAL Boilers are so designed that any casting, whether Round or Square, may be taken through any door or opening which is not less than 2 feet 6 inches wide.

# Ideal Arco Steam Boilers

(Patented)



No. 2-22-S. (Without Trimmings)

No.	Height (to top outlet) inches	Nomi- nal Diam. Grate Inches	Grate Area Sq. Ft.	Average Fire- pot Sq. Ft.	Height Water Line Inches	1 Out- let 2 Inlets Inches	Smoke Pipe Inches	* Ra- tings	List Price Complete
2-19-S	57	19	1.76	1.84	50	2½	8	350	\$167.00
3-19-S	61½	19	1.76	1.84	54½	2½	8	400	193.00
2-22-S	58¾	22	2.40	2.53	53½	3	9	525	226.00
3-22-S	63¾	22	2.40	2.53	56¾	3	9	575	240.00
2-25-S	61¾	25	3.14	3.20	54¾	3½	9	625	277.50
3-25-S	66¾	25	3.14	3.20	59¾	3½	9	700	300.00
2-28-S	62½	28	4.12	4.30	56	4	10	900	360.50
3-28-S	67 <sup>7</sup> / <sub>8</sub>	28	4.12	4.30	61¾	4	10	1000	389.50
2-31-S	66	31	4.90	5.10	57¾	4	10	1275	470.00
3-31-S	71 <sup>7</sup> / <sub>8</sub>	31	4.90	5.10	63¾	4	10	1400	500.00
2-34-S	69	34	5.94	6.00	59¾	5	11	1500	530.00
3-34-S	75	34	5.94	6.00	65½	5	11	1650	575.00

For Price List of Boiler parts, see pages 186 to 205 inclusive.

For additional detailed measurements, see pages 34 and 35.

*\*For Fuels and Ratings, see page 9.*



# Ideal Arco Water Boilers

(Patented)



No. 2-22-W Water Boiler

No.	Height (to top outlet) Inches	Nomi- nal Diam. Grate Inches	Grate Area Sq. Ft.	Aver- age Fire- pot Sq. Ft.	Outlets No. and Size	Inlets No. and Size	Smoke Pipe Inches	* Ra- tings	List Price Complete
2-19-W	50 $\frac{3}{8}$	19	1.76	1.84	2-2 $\frac{1}{2}$	2-2 $\frac{1}{2}$	8	575	\$158.00
3-19-W	54 $\frac{3}{8}$	19	1.76	1.84	2-2 $\frac{1}{2}$	2-2 $\frac{1}{2}$	8	650	184.50
2-22-W	52 $\frac{1}{4}$	22	2.40	2.53	2-3	2-3	9	875	217.50
3-22-W	57 $\frac{1}{4}$	22	2.40	2.53	2-3	2-3	9	950	230.00
2-25-W	55	25	3.14	3.20	2-3 $\frac{1}{2}$	2-3 $\frac{1}{2}$	9	1025	270.00
3-25-W	60	25	3.14	3.20	2-3 $\frac{1}{2}$	2-3 $\frac{1}{2}$	9	1150	290.00
2-28-W	55 $\frac{1}{2}$	28	4.12	4.30	2-4	2-4	10	1500	350.50
3-28-W	60 $\frac{1}{2}$	28	4.12	4.30	2-4	2-4	10	1650	380.00
2-31-W	59	31	4.90	5.10	2-4	2-4	10	2100	457.50
3-31-W	64 $\frac{3}{4}$	31	4.90	5.10	2-4	2-4	10	2325	495.00
2-34-W	61 $\frac{5}{8}$	34	5.94	6.00	2-5	2-5	11	2475	525.00
3-34-W	66 $\frac{5}{8}$	34	5.94	6.00	2-5	2-5	11	2725	565.00

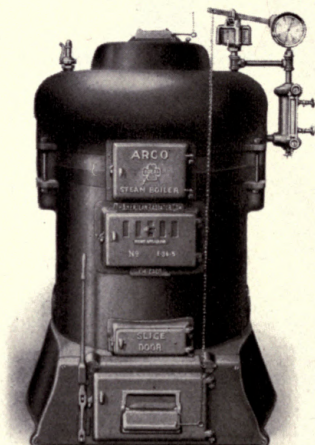
For Price List of Boiler parts, see pages 186 to 205, inclusive.

For additional detailed measurements, see pages 34 and 35.

\* For Fuels and Ratings, see page 9.

# Ideal Arco Steam Boilers

(Patented)



## No. 1-34-S Boiler

The following sizes of Steam Boilers with one intermediate section are specially suited to low chimneys; and for soft coal. (See page 9.)

No.	Height (to top outlet) Inches	Nom. Diam. Grate Inches	Grate Area Sq. Ft.	Aver. Fire- pot Sq. Ft	Height Water Line Inches	1 Out- let 2 Inlets Inches	Smoke Pipe Inches	* Ra- tings	List Price Complete
1-19-S	52 $\frac{1}{2}$	19	1.76	1.84	45 $\frac{1}{2}$	2 $\frac{1}{2}$	8	275	\$140.50
1-22-S	54 $\frac{3}{4}$	22	2.40	2.53	49	3	9	400	193.00
1-25-S	56 $\frac{3}{4}$	25	3.14	3.20	49 $\frac{1}{4}$	3 $\frac{1}{2}$	9	500	219.50
1-28-S	57 $\frac{3}{4}$	28	4.12	4.30	50	4	10	800	331.00
1-31-S	60 $\frac{3}{4}$	31	4.90	5.10	52 $\frac{1}{2}$	4	10	1000	389.50
1-34-S	64	34	5.94	6.00	54 $\frac{3}{4}$	5	11	1250	462.50

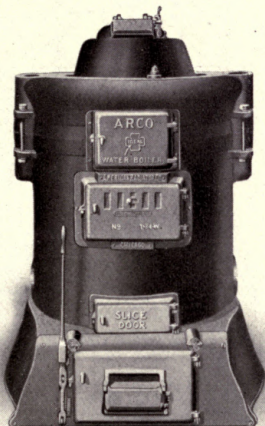
For Price List of Boiler parts, see pages 186 to 205, inclusive.

For additional detailed measurements, see pages 34 and 35.

\* For Fuels and Ratings, see page 9.

# Ideal Arco Water Boilers

(Patented)



## No. 1-34-W Boiler

The following sizes of Water Boilers with one intermediate section are specially suited to low chimneys; and for soft coal. (See page 9.)

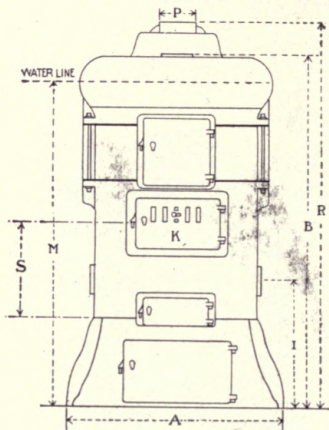
No.	Height (to top outlet) Inches	Nom. Diam. Grate Inches	Grate Area Sq. Ft.	Aver. Fire- pot Sq. Ft.	Outlets No. and Size	Inlets No. and Size	Smoke Pipe Inches	* Ra- tings	List Price Complete
1-19-W	45 $\frac{7}{8}$	19	1.76	1.84	2-2 $\frac{1}{2}$	2-2 $\frac{1}{2}$	8	450	\$131.50
1-22-W	48 $\frac{1}{4}$	22	2.40	2.53	2-3	2-3	9	650	184.00
1-25-W	50	25	3.14	3.20	2-3 $\frac{1}{2}$	2-3 $\frac{1}{2}$	9	825	210.50
1-28-W	50 $\frac{1}{2}$	28	4.12	4.30	2-4	2-4	10	1325	321.00
1-31-W	54 $\frac{1}{4}$	31	4.90	5.10	2-4	2-4	10	1650	380.00
1-34-W	56 $\frac{1}{4}$	34	5.94	6.00	2-5	2-5	11	2075	450.00

For Price List of Boiler parts, see pages 186 to 205, inclusive.

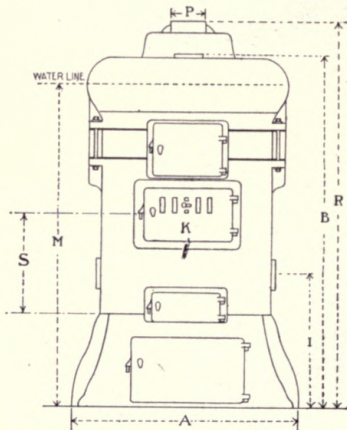
For additional detailed measurements, see pages 34 and 35.

\* For Fuels and Ratings, see page 9.

# Ideal Arco Measurements



**For Hard Coal**



**For Soft Coal**

(Above outlines do not represent the Water Boiler—the outlines are of Steam Boilers used to show measurements of both types.)

For details of measurements see page 35.



# Ideal Arco Measurements—Continued

Table of distances between points as outlined on skeleton sketch of Boilers shown on page 34.

These measurements are given in inches.

## Steam

No.	A	B	I	K	M	P	R	S
1-19-S	30 1/2	52 1/2	14 3/4	8 1/2 x 11 3/4	45 1/2	8	59 3/4	15 3/4
2-19-S	30 1/2	57	14 3/4	8 1/2 x 11 3/4	50	8	64 1/4	15 3/4
3-19-S	30 1/2	61 1/2	14 3/4	8 1/2 x 11 3/4	54 1/2	8	68 3/4	15 3/4
1-22-S	35	54 3/4	16 1/4	9 x 13 1/4	49	9	62 3/4	16
2-22-S	35	58 3/4	16 1/4	9 x 13 1/4	53 1/2	9	67	16
3-22-S	35	63 3/4	16 1/4	9 x 13 1/4	56 7/8	9	71 1/4	16
1-25-S	38	56 3/4	17 1/2	9 x 13 1/4	49 1/4	9	65 1/4	16
2-25-S	38	61 3/4	17 1/2	9 x 13 1/4	54 1/4	9	70 1/4	16
3-25-S	38	66 3/4	17 1/2	9 x 13 1/4	59 1/4	9	75 1/4	16
1-28-S	41 3/8	57 3/4	17 3/4	9 5/8 x 18	50	10	66	18
2-28-S	41 3/8	62 1/2	17 3/4	9 5/8 x 18	56	10	70 1/4	18
3-28-S	41 3/8	67 7/8	17 3/4	9 5/8 x 18	61 3/4	10	75 1/4	18
1-31-S	44 1/8	60 3/4	18	9 5/8 x 18	52 1/2	10	69 1/2	19 1/2
2-31-S	44 1/8	66	18	9 5/8 x 18	57 1/4	10	76	19 1/2
3-31-S	44 1/8	71 7/8	18	9 5/8 x 18	63 1/4	10	81 1/4	19 1/2
1-34-S	48 7/8	64	19	9 5/8 x 18	54 3/4	11	73 1/4	20
2-34-S	48 7/8	69	19	9 5/8 x 18	59 3/8	11	77 1/2	20
3-34-S	48 7/8	75	19	9 5/8 x 18	65 1/2	11	84 1/4	20

## Water

No.	A	B	I	K	P	R	S
1-19-W	30 1/2	45 7/8	14 3/4	8 1/2 x 11 3/4	8	53 1/8	15 3/4
2-19-W	30 1/2	50 3/8	14 3/4	8 1/2 x 11 3/4	8	57 5/8	15 3/4
3-19-W	30 1/2	54 7/8	14 3/4	8 1/2 x 11 3/4	8	62 1/2	15 3/4
1-22-W	35	48 1/4	16 1/4	9 x 13 1/4	9	56 1/4	16
2-22-W	35	52 1/4	16 1/4	9 x 13 1/4	9	60 1/2	16
3-22-W	35	57 1/4	16 1/4	9 x 13 1/4	9	64 3/4	16
1-25-W	38	50	17 1/2	9 x 13 1/4	9	58 1/2	16
2-25-W	38	55	17 1/2	9 x 13 1/4	9	63 1/2	16
3-25-W	38	60	17 1/2	9 x 13 1/4	9	68 1/2	16
1-28-W	41 3/8	50 1/2	17 3/4	9 5/8 x 18	10	59	18
2-28-W	41 3/8	55 1/2	17 3/4	9 5/8 x 18	10	63 1/4	18
3-28-W	41 3/8	60 1/2	17 3/4	9 5/8 x 18	10	68 1/4	18
1-31-W	44 1/8	54 1/4	18	9 5/8 x 18	10	62 3/8	19 1/2
2-31-W	44 1/8	59	18	9 5/8 x 18	10	67 5/8	19 1/2
3-31-W	44 1/8	64 3/4	18	9 5/8 x 18	10	74 1/8	19 1/2
1-34-W	48 7/8	56 1/4	19	9 5/8 x 18	11	64 5/8	20
2-34-W	48 7/8	61 5/8	19	9 5/8 x 18	11	70 1/8	20
3-34-W	48 7/8	66 5/8	19	9 5/8 x 18	11	75 1/8	20

See page 38 for distances between centers of outlets and inlets.



# Ideal Premier Steam Boilers



No. 2024 Steam Boiler

No.	Height (to top outlet) inches	Nom. Diam. Grate Inches	Grate Area Sq. Ft.	Average Fire- pot Sq. Ft.	Height Water Line Inches	Outlets and In- lets† Size Inches	Smoke Pipe Inches	* Ra- tings	List Price Complete
1015	45	15	1.21	1.06	40½	2	7	175	\$105.50
2015	49	15	1.21	1.06	44½	2	7	200	114.00
†3015	53	15	1.21	1.06	48½	2	7	225	123.00
1018	47½	18	1.76	1.53	43½	2½	7	275	140.50
2018	52	18	1.76	1.53	47½	2½	7	300	149.50
†3018	56½	18	1.76	1.53	51¾	2½	7	325	158.00
1021	50	21	2.40	2.18	44½	3	9	400	193.00
2021	54	21	2.40	2.18	49	3	9	425	199.50
†3021	58	21	2.40	2.18	53½	3	9	450	206.50
†4021	62 <sup>3</sup> / <sub>16</sub>	21	2.40	2.18	58½	3	9	475	213.00
1024	51	24	3.14	2.82	45½	3½	9	525	226.00
2024	55½	24	3.14	2.82	50¼	3½	9	575	240.00
†3024	60	24	3.14	2.82	55	3½	9	625	277.50
†4024	64 <sup>13</sup> / <sub>16</sub>	24	3.14	2.82	59 <sup>9</sup> / <sub>16</sub>	3½	9	650	287.50
†1027	51½	27	3.90	3.83	46¾	4	10	750	317.00
†2027	56 <sup>7</sup> / <sub>16</sub>	27	3.90	3.83	51 <sup>5</sup> / <sub>16</sub>	4	10	800	331.00
†3027	61¾	27	3.90	3.83	56¼	4	10	850	346.00
†4027	66 <sup>5</sup> / <sub>16</sub>	27	3.90	3.83	61 <sup>3</sup> / <sub>16</sub>	4	10	900	360.50

† We do not recommend the use of these sizes with low grades of soft coal.

† Two outlets and three inlets.

For Price List of Boiler parts, see pages 186 to 205, inclusive.

For additional measurements, see pages 38 and 39.

\* For Fuels and Ratings, see page 9.

# Ideal Premier Water Boilers



No. 2124 Water Boiler

No.	Height (to top outlet) Inches	Nom. Diam. Grate Inches	Grate Area Sq. Ft.	Average Firepot Sq. Ft.	Outlets and Inlets† Size Inches	Smoke- Pipe Inches	Ra- tings *	List Price Complete
1115	40	15	1.21	1.06	2	7	300	\$88.00
2115	44	15	1.21	1.06	2	7	325	96.50
†3115	48	15	1.21	1.06	2	7	350	101.00
1118	42½	18	1.76	1.53	2½	7	450	131.50
2118	47	18	1.76	1.53	2½	7	500	140.50
†3118	51½	18	1.76	1.53	2½	7	550	153.50
1121	44	21	2.40	2.18	3	9	600	164.50
2121	48½	21	2.40	2.18	3	9	650	184.00
†3121	53	21	2.40	2.18	3	9	700	191.00
†4121	57½ <sup>5</sup> / <sub>16</sub>	21	2.40	2.18	3	9	750	197.00
1124	45	24	3.14	2.82	3½	9	875	217.50
2124	50	24	3.14	2.82	3½	9	950	230.00
†3124	55	24	3.14	2.82	3½	9	1025	270.00
†4124	59½ <sup>5</sup> / <sub>16</sub>	24	3.14	2.82	3½	9	1075	277.50
1127	46	27	3.90	3.83	4	10	1250	307.00
2127	50½ <sup>5</sup> / <sub>16</sub>	27	3.90	3.83	4	10	1325	321.00
†3127	55½ <sup>5</sup> / <sub>16</sub>	27	3.90	3.83	4	10	1400	336.00
†4127	60½ <sup>5</sup> / <sub>16</sub>	27	3.90	3.83	4	10	1475	350.50

†We do not recommend the use of these sizes with low grades of soft coal.

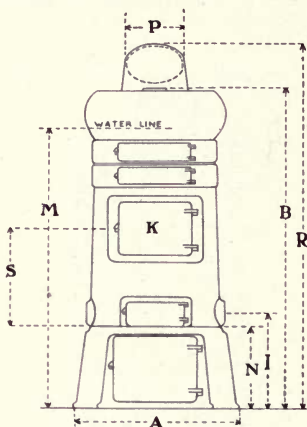
‡All except 27-inch Grate Diameter have three outlet and three inlet tappings; 27-inch Boilers have two outlet and three inlet tappings.

For additional measurements, see pages 38 and 39.

For price list of boiler parts, see pages 186 to 205, inclusive.

\* For Fuels and Ratings, see page 9.

# Premier Boiler Measurements



(Above outline represents Steam Boilers—outlines of which are used to show measurements of both types.)  
For details of measurements, see page 39.

## Tapping Data on Ideal Water Boilers

To enable fitters to cut their piping at their shops we herewith publish a table giving the distances between the centers of outlets on top of the Boiler, and between the faces of the bosses in which the inlets are tapped on each side of the Boiler.

Arco Boilers			Premier Boilers		
Grate Inches	Between Centers of Outlets Inches	*Between Return Inlets Inches	Grate Inches	Between Centers of Outlets Inches	*Between Return Inlets Inches
19	19 $\frac{1}{4}$	24 $\frac{1}{8}$	15	13 $\frac{1}{2}$	19 $\frac{3}{4}$
22	23	27 $\frac{1}{2}$	18	16 $\frac{1}{8}$	22 $\frac{1}{8}$
25	25 $\frac{1}{4}$	30 $\frac{3}{8}$	21	17 $\frac{7}{8}$	25 $\frac{1}{8}$
28	28 $\frac{3}{8}$	34 $\frac{1}{8}$	24	20 $\frac{5}{8}$	28 $\frac{3}{4}$
31	32 $\frac{3}{8}$	36 $\frac{3}{8}$	27	22 $\frac{5}{8}$	32 $\frac{3}{4}$
34	36 $\frac{9}{16}$	39 $\frac{3}{4}$			

### Standard Boilers

Grate Inches	Between Centers of Outlets Inches	Between Return Inlets Inches	Grate Inches	Between Centers of Outlets Inches	Between Return Inlets Inches
15	15 $\frac{1}{4}$	19 $\frac{1}{8}$	25	24 $\frac{3}{4}$	30 $\frac{1}{8}$
17	17 $\frac{1}{8}$	21 $\frac{1}{8}$	28	27 $\frac{1}{8}$	33 $\frac{3}{8}$
19	19 $\frac{1}{4}$	24 $\frac{1}{8}$	31	29 $\frac{1}{4}$	36 $\frac{1}{4}$
22	21 $\frac{1}{8}$	27	34	32 $\frac{3}{8}$	39 $\frac{1}{8}$

\* NOTE.—This distance between return tapplings applies also on Steam Boilers.

The distance between return inlets of both Steam and Water Sectional Boilers is: 15-inch grate, 25 $\frac{1}{2}$  inches; 19-inch grate, 29 $\frac{5}{8}$  inches; 22-inch grate, 33 $\frac{9}{8}$  inches; 25-inch grate, 39 $\frac{3}{8}$  inches; 28-inch grate, 41 $\frac{1}{8}$  inches; 36-inch grate, 52 $\frac{5}{8}$  inches; 48-inch grate, 64 $\frac{1}{8}$  inches.

# Premier Boiler Measurements—Continued

Table of distances between points outlined on skeleton sketch of Boilers shown on page 38. These measurements are given in inches.

## Steam

No.	A	B	I	K	M	P	*R	S
1015	24	45 $\frac{1}{4}$	15 $\frac{1}{8}$	8 x 10 $\frac{1}{2}$	40 $\frac{1}{2}$	7	52	15 $\frac{3}{4}$
2015	24	49 $\frac{1}{4}$	15 $\frac{1}{8}$	8 x 10 $\frac{1}{2}$	44 $\frac{1}{2}$	7	56	15 $\frac{3}{4}$
3015	24	53 $\frac{1}{4}$	15 $\frac{1}{8}$	8 x 10 $\frac{1}{2}$	48 $\frac{1}{2}$	7	60	15 $\frac{3}{4}$
1018	27	47 $\frac{3}{4}$	15 $\frac{3}{8}$	9 x 11 $\frac{5}{8}$	43 $\frac{1}{4}$	7	54 $\frac{1}{2}$	17 $\frac{3}{4}$
2018	27	52	15 $\frac{3}{8}$	9 x 11 $\frac{5}{8}$	47 $\frac{1}{2}$	7	58 $\frac{3}{4}$	17 $\frac{3}{4}$
3018	27	56 $\frac{1}{4}$	15 $\frac{3}{8}$	9 x 11 $\frac{5}{8}$	51 $\frac{3}{4}$	7	63	17 $\frac{3}{4}$
1021	30 $\frac{1}{8}$	49 $\frac{1}{4}$	15 $\frac{7}{8}$	10 $\frac{1}{8}$ x 13 $\frac{1}{4}$	44 $\frac{1}{2}$	9	57 $\frac{1}{4}$	18 $\frac{1}{8}$
2021	30 $\frac{1}{8}$	53 $\frac{3}{4}$	15 $\frac{7}{8}$	10 $\frac{1}{8}$ x 13 $\frac{1}{4}$	49	9	61 $\frac{3}{4}$	18 $\frac{1}{8}$
3021	30 $\frac{1}{8}$	58 $\frac{1}{4}$	15 $\frac{7}{8}$	10 $\frac{1}{8}$ x 13 $\frac{1}{4}$	53 $\frac{1}{2}$	9	66 $\frac{1}{4}$	18 $\frac{1}{8}$
4021	30 $\frac{1}{8}$	62 $\frac{9}{16}$	15 $\frac{7}{8}$	10 $\frac{1}{8}$ x 13 $\frac{1}{4}$	58 $\frac{1}{8}$	9	71 $\frac{8}{16}$	18 $\frac{1}{8}$
1024	33 $\frac{1}{8}$	50 $\frac{3}{4}$	16 $\frac{1}{8}$	10 $\frac{1}{8}$ x 13 $\frac{1}{4}$	45 $\frac{1}{2}$	9	58 $\frac{3}{4}$	18 $\frac{1}{8}$
2024	33 $\frac{1}{8}$	55 $\frac{1}{2}$	16 $\frac{1}{8}$	10 $\frac{1}{8}$ x 13 $\frac{1}{4}$	50 $\frac{1}{4}$	9	63 $\frac{1}{2}$	18 $\frac{1}{8}$
3024	33 $\frac{1}{8}$	60 $\frac{1}{4}$	16 $\frac{1}{8}$	10 $\frac{1}{8}$ x 13 $\frac{1}{4}$	55	9	68 $\frac{1}{4}$	18 $\frac{1}{8}$
4024	33 $\frac{1}{8}$	65	16 $\frac{1}{8}$	10 $\frac{1}{8}$ x 13 $\frac{1}{4}$	59 $\frac{9}{16}$	9	73 $\frac{7}{16}$	18 $\frac{1}{8}$
1027	34	51 $\frac{1}{2}$	16 $\frac{3}{8}$	9 x 15	46 $\frac{3}{8}$	10	62 $\frac{1}{2}$	18 $\frac{3}{8}$
2027	34	56 $\frac{7}{16}$	16 $\frac{3}{8}$	9 x 15	51 $\frac{5}{16}$	10	67 $\frac{7}{16}$	18 $\frac{3}{8}$
3027	34	61 $\frac{3}{8}$	16 $\frac{3}{8}$	9 x 15	56 $\frac{1}{4}$	10	72 $\frac{3}{8}$	18 $\frac{3}{8}$
4027	34	66 $\frac{5}{16}$	16 $\frac{3}{8}$	9 x 15	61 $\frac{8}{16}$	10	77 $\frac{5}{16}$	18 $\frac{3}{8}$

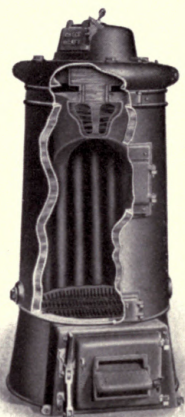
## Water

No.	A	B	I	K	P	*R	S
1115	24	40 $\frac{1}{2}$	15 $\frac{1}{8}$	8 x 10 $\frac{1}{2}$	7	47 $\frac{1}{4}$	15 $\frac{3}{4}$
2115	24	44 $\frac{1}{2}$	15 $\frac{1}{8}$	8 x 10 $\frac{1}{2}$	7	51 $\frac{1}{4}$	15 $\frac{3}{4}$
3115	24	48 $\frac{1}{2}$	15 $\frac{1}{8}$	8 x 10 $\frac{1}{2}$	7	55 $\frac{1}{4}$	15 $\frac{3}{4}$
1118	27	42 $\frac{3}{4}$	15 $\frac{3}{8}$	9 x 11 $\frac{5}{8}$	7	49 $\frac{1}{2}$	17 $\frac{3}{4}$
2118	27	47	15 $\frac{3}{8}$	9 x 11 $\frac{5}{8}$	7	53 $\frac{3}{4}$	17 $\frac{3}{4}$
3118	27	51 $\frac{1}{4}$	15 $\frac{3}{8}$	9 x 11 $\frac{5}{8}$	7	58	17 $\frac{3}{4}$
1121	30 $\frac{1}{8}$	44	15 $\frac{7}{8}$	10 $\frac{1}{8}$ x 13 $\frac{1}{4}$	9	52	18 $\frac{1}{8}$
2121	30 $\frac{1}{8}$	48 $\frac{1}{2}$	15 $\frac{7}{8}$	10 $\frac{1}{8}$ x 13 $\frac{1}{4}$	9	56 $\frac{1}{2}$	18 $\frac{1}{8}$
3121	30 $\frac{1}{8}$	53	15 $\frac{7}{8}$	10 $\frac{1}{8}$ x 13 $\frac{1}{4}$	9	61	18 $\frac{1}{8}$
4121	30 $\frac{1}{8}$	57 $\frac{5}{16}$	15 $\frac{7}{8}$	10 $\frac{1}{8}$ x 13 $\frac{1}{4}$	9	65 $\frac{15}{16}$	18 $\frac{1}{8}$
1124	33 $\frac{1}{8}$	45 $\frac{1}{4}$	16 $\frac{1}{8}$	10 $\frac{1}{8}$ x 13 $\frac{1}{4}$	9	53 $\frac{1}{4}$	18 $\frac{1}{8}$
2124	33 $\frac{1}{8}$	50	16 $\frac{1}{8}$	10 $\frac{1}{8}$ x 13 $\frac{1}{4}$	9	58	18 $\frac{1}{8}$
3124	33 $\frac{1}{8}$	54 $\frac{3}{4}$	16 $\frac{1}{8}$	10 $\frac{1}{8}$ x 13 $\frac{1}{4}$	9	62 $\frac{3}{4}$	18 $\frac{1}{8}$
4124	33 $\frac{1}{8}$	59 $\frac{5}{16}$	16 $\frac{1}{8}$	10 $\frac{1}{8}$ x 13 $\frac{1}{4}$	9	67 $\frac{15}{16}$	18 $\frac{1}{8}$
1127	32 $\frac{1}{2}$	46	16 $\frac{3}{8}$	9 x 15	10	57	18 $\frac{3}{8}$
2127	32 $\frac{1}{2}$	50 $\frac{15}{16}$	16 $\frac{3}{8}$	9 x 15	10	61 $\frac{15}{16}$	18 $\frac{3}{8}$
3127	32 $\frac{1}{2}$	55 $\frac{7}{8}$	16 $\frac{3}{8}$	9 x 15	10	66 $\frac{7}{8}$	18 $\frac{3}{8}$
4127	32 $\frac{1}{2}$	60 $\frac{3}{16}$	16 $\frac{3}{8}$	9 x 15	10	71 $\frac{3}{16}$	18 $\frac{3}{8}$

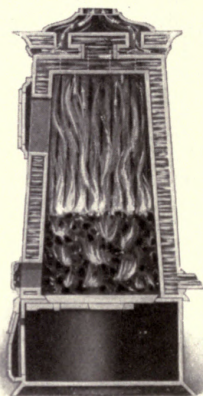
\* NOTE.—When smoke-pipe is reversed add 1 $\frac{1}{4}$  inches to the 15-inch and 18-inch and 1 $\frac{1}{8}$  inches to the 21-inch and 24-inch measurements.

See page 38 for distances between centers of outlets and inlets.

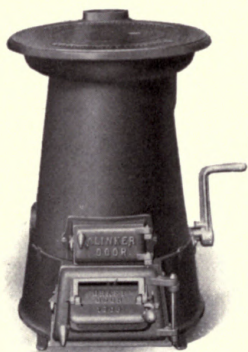
# Ideal Water and Laundry Heaters



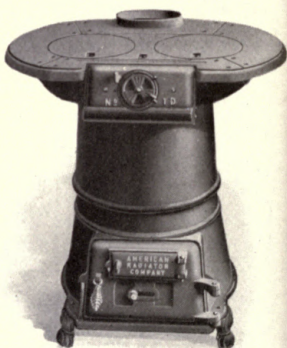
No. 152 Ideal Premier



No. 10 Ideal Junior



No. 10 Ideal Arco



No. 1-D Ideal Laundry

See pages 218 to 227 inclusive for temperature ratings.



# Ideal Water and Laundry Heaters

## Data and List Prices

Style	No.	Nominal Diameter Grate Inches	Grate Area Sq.Ft.	Outlets Inches	List Price Complete
†IDEAL Premier	101	10	.59	1-1½	\$ 37.00
“ “	121	12	.84	3-1½	65.00
“ “	§122	12	.84	3-1½	77.00
“ “	151	15	1.23	3-2	89.00
“ “	§152	15	1.23	3-2	106.00
“ “	181	18	1.92	3-2	118.00
“ “	§182	18	1.92	3-2	138.00
†IDEAL Junior	0	10	.54	1-1½	34.00
“ “	10	12	.80	3-1½	57.00
“ “	§12	12	.80	3-1½	73.00
“ “	20	15	1.23	3-2	83.00
“ “	§22	15	1.23	3-2	102.00
“ “	30	18	1.92	3-2	114.00
“ “	§32	18	1.92	3-2	142.00
IDEAL Arco	10	10	.54	1-1½	33.00
“ “	12	12	.80	1-1½	37.00
“ “	15	15	1.23	1-1½	50.00
IDEAL Laundry	1-D	10	.54	1-1	31.00

See pages 218 to 227 inclusive, for ratings.

† No. 101 is not provided with butterfly doors, but can be so equipped if ordered. None of these Heaters has an intermediate section.

‡ Nos. 0 to 12 have slide-center grates; Nos. 20 to 32 have rocking grates.

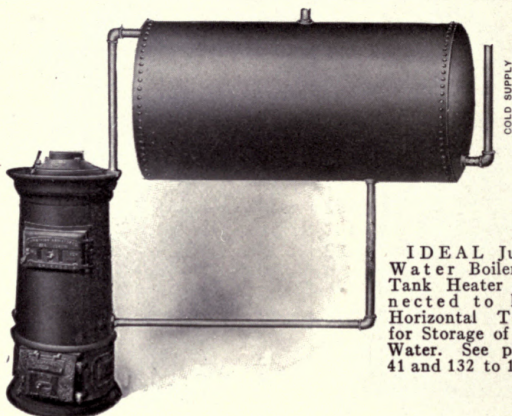
§ Equipped with Dome sections.

When Water Heaters are subjected to some unusual pressure, as is the case when tanks are connected direct to City Pumping Station, and the pressure is increased during times of conflagration or the like, it is recommended that the system be equipped with a Water-Pressure Reducing Valve.

No fire tools are supplied with IDEAL Water Heaters.

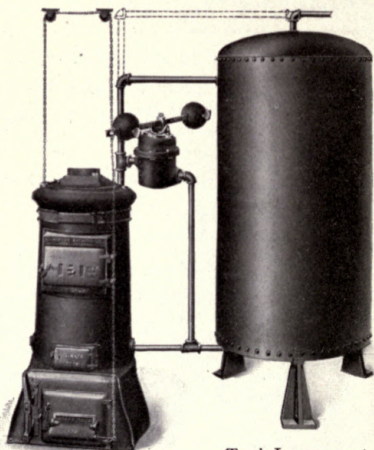
For Price List of Boiler parts, see pages 186 to 205 inclusive.

# Water Heaters and Storage Tanks



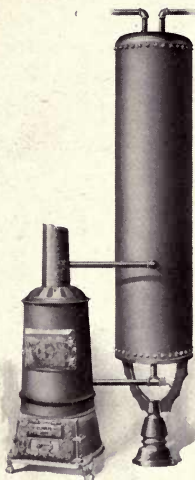
IDEAL Junior Water Boiler or Tank Heater connected to large Horizontal Tank for Storage of Hot Water. See pages 41 and 132 to 135.

IDEAL Premier Junior Water Heater connected to Vertical Tank and a Sylphon Damper Regulator for controlling the temperature of the water. See pages 218 to 227. Dotted lines show other methods of connection—top piping outlines show a method of getting extra-quick hot faucet supply. (See pages 41 and 132 to 135.)



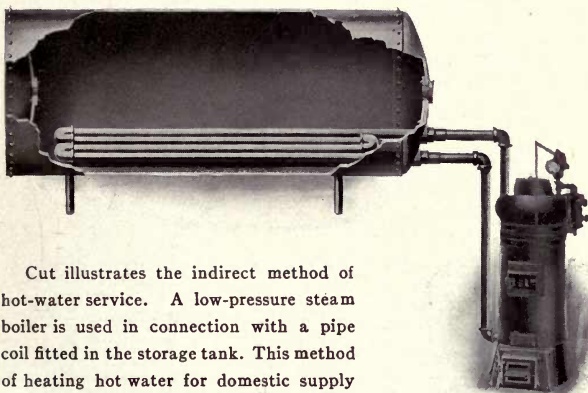
Tank Legs per set of three, List Price \$3.00.  $7\frac{3}{4}$  inches floor to tank;  $8\frac{1}{4}$  inches over all.

# Water Heaters and Storage Tanks



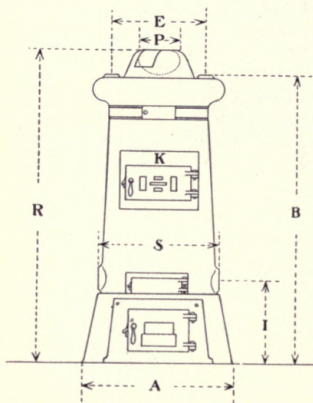
This view shows a No. 0 IDEAL Water Heater connected to a kitchen range Boiler.

IDEAL Water Heaters are also used very economically to warm small cottages or parts of homes, offices, livery stables, barns, small stores, railroad switch towers, and small stations, commission storage rooms, etc. For prices, see page 41.

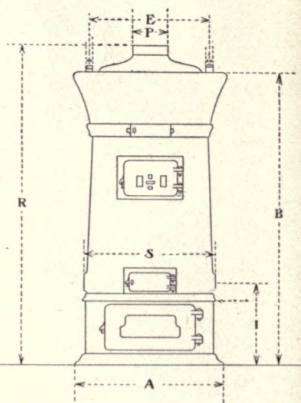


Cut illustrates the indirect method of hot-water service. A low-pressure steam boiler is used in connection with a pipe coil fitted in the storage tank. This method of heating hot water for domestic supply should be used when there is a liability of deposit, as this will accumulate in the storage tank, from which it can be readily removed through the man-hole. This method should also be used when the water is exceptionally soft, and likely to cause discoloration. This system requires no additional space for installation, and prevents any possible injury to Boiler.

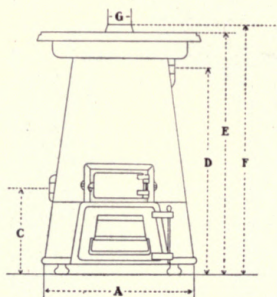
## Ideal Water-Heater Dimensions



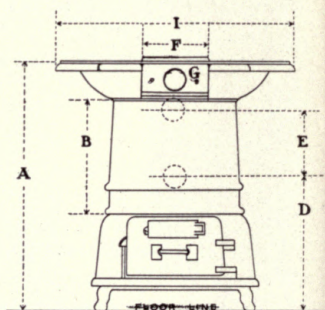
### Ideal Premier Junior



## Ideal Junior



## Ideal Arco



## Ideal Laundry

See pages 218 to 227 inclusive for temperature ratings.



# Ideal Water-Heater Dimensions—Cont'd

## Ideal Junior Water Heaters

No.	R	A	P	B	S	I	E
0	34½	18	5	31	.....	14⅝	.....
10	39	20¼	6	35	18¾	13¼	12
12	43⅛	20¼	6	39⅛	18¾	13¼	12
20	47⅞	22⅞	6	42⅛	20 <sup>9</sup> / <sub>16</sub>	14½	14⅞
22	51⅞	22⅞	6	46⅛	20 <sup>9</sup> / <sub>16</sub>	14½	14⅞
30	47⅞	26¼	7	42¾	23⅞	15¼	18¼
32	51⅞	26¼	7	46¾	23⅞	15¼	18

## Ideal Premier Junior Water Heaters

No.	A	B	E	I	P	R	S
101	18	29⅝	.....	9¼	5	33⅛	.....
121	24	37¼	12	13⅞	6	41½	18¼
122	24	42½	14¾	13⅞	6	46¾	18¼
151	25¾	42⅝	14¾	15⅛	6	47⅝	20⅝
152	25¾	47⅞	17¼	15⅛	7	53⅝	20⅝
181	27	44¾	18¼	15⅛	7	50	24¼
182	27	51¼	17¾	15⅛	7	57	24¼

## Ideal Arco Water Heaters

No.	A	C	D	E	F	G
10	16	9⅝	21½	26¾	27½	5
12	19½	9⅞	22⅜	27½	28¼	5
15	21	10⅜	24½	30¼	31	6

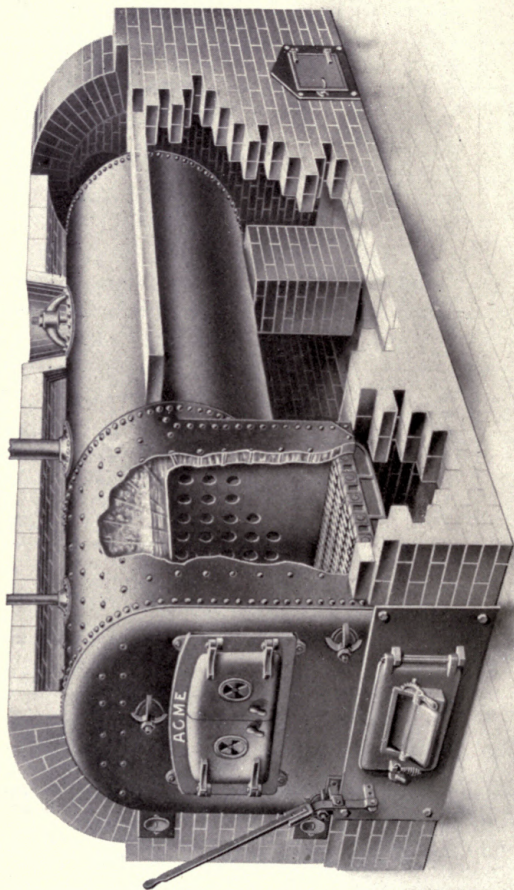
## Ideal Laundry Water Heater No. 1-D

No.	A	B	I	F	D	E	G
1-D	27	12⅜	27½	6	14½	7 <sup>7</sup> / <sub>16</sub>	5¼x9¾

See pages 218 to 227 inclusive for ratings.



# Acme Fire-Box Boilers



Showing Brick Setting

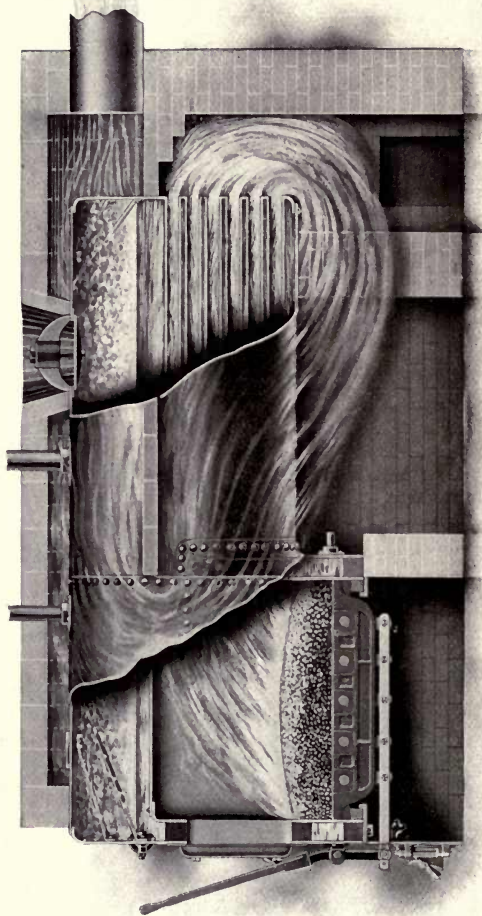
# Acme Fire-Box Boilers

For Brick Setting. Without Domes. Manholes in all Boilers over 30 inches Diameter

NUMBER	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Diameter of Shell .... in.	30	30	30	36	36	36	42	42	42	48	48	48	54	54	60	60	66	66	72	72
Length over all ..... ft.	6½	7½	8½	7½	9	10½	8½	10	11½	10½	12	13½	14	16½	15½	18	16	18	16	18
Length of Fire-Box .... in.	26	32	38	32	38	44	38	44	50	44	50	56	56	62	62	68	62	68	68	74
Width of Fire-Box .... in.	24	24	24	30	30	30	36	36	36	42	42	42	48	48	54	54	60	60	66	66
Fire Doors { Single.....in. Double.....in.	12 x 16	12 x 16	12 x 16	16 x 22	16 x 22	16 x 22	16 x 24	16 x 24	16 x 24	18 x 30	18 x 30	18 x 30	18 x 30	18 x 30	18 x 24	18 x 24	18 x 24	18 x 24	18 x 24	18 x 24
Approximate weight of Boiler complete with castings.....lbs.	2400	2700	3100	3500	3800	4400	4600	5200	5700	6700	7300	8100	9200	10500	13600	15000	16500	18000	19900	21400
Steam { Tapping { Steam Outlet Return Outlet	3	3	4	4	4	4	6	6	6	6	6	7	7	7	7	7	8	8	8	8
Water Tapping—Flow and Return, 2 each....	2½	2½	3	3	3	3	4	4	4	4	4	5	5	5	5	5	6	6	6	6
Size of Smoke-Pipe .... in.	4	4	4	5	5	5	5	6	6	6	6	7	7	7	7	8	8	10	10	10
Rating, Steam.....sq. ft.	16	16	16	18	18	18	20	20	20	22	22	22	24	24	30	30	34	34	40	40
Rating, Water.....sq. ft.	900	1000	1200	1400	1700	2100	2200	2500	2900	3200	3800	4400	4900	5800	7200	8500	9300	10500	11200	12800
Price Steam Boiler com- plete with castings— no trimmings.....	1400	1600	1900	2200	2700	3400	3500	4000	4600	5100	6100	7000	7800	9300	11500	13600	14800	16800	17900	20500
Steam Trimmings, extra	\$285.00	300.00	320.00	375.00	400.00	435.00	460.00	510.00	560.00	630.00	680.00	735.00	860.00	935.00	1200.00	1310.00	1500.00	1600.00	1800.00	2000.00
Price Water Boiler with castings—no trimmings..	\$18.00	18.00	19.00	19.00	19.00	19.00	23.00	23.00	23.00	23.00	23.00	28.00	28.00	28.00	40.00	40.00	40.00	40.00	44.00	44.00
	\$295.00	310.00	330.00	390.00	415.00	450.00	475.00	525.00	575.00	645.00	695.00	755.00	880.00	955.00	1225.00	1335.00	1530.00	1630.00	1840.00	2040.00

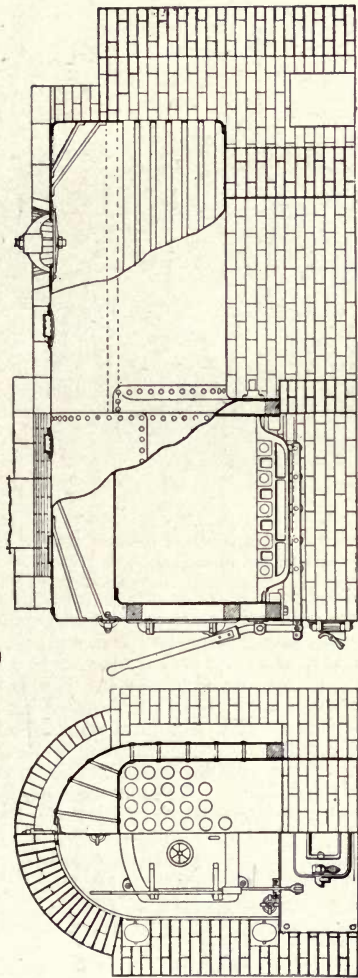
No extra charge made for hoe and poker shipped with boiler. Tubes inserted in fire-box for domestic coil will be charged extra, \$2.00 net.  
\*Boilers No. 15 to 20 have two single fire doors.

## Acme Fire-Box Boilers



Showing Smoke Travel

# Brick-Setting Plan for Acme Fire-Box Boilers



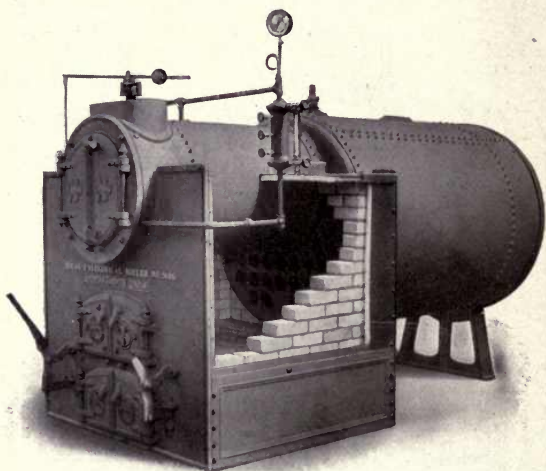
NUMBER	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Extreme Height of Brick-work.....	72"	72"	72"	81"	81"	81"	87"	87"	87"	95"	95"	95"	104"	104"	109"	109"	119"	119"	129"	129"
Height to Top of Boiler.....	57"	57"	57"	64"	64"	64"	72"	72"	72"	78"	78"	78"	86"	86"	92"	92"	98"	98"	106"	106"
Height of Water Line.....	51"	51"	51"	56"	56"	56"	61"	61"	61"	65"	65"	65"	66"	66"	72"	72"	78"	78"	84"	84"
Height of Ash-Pit Front.....	17"	17"	17"	17"	17"	17"	17"	17"	17"	17"	17"	17"	17"	17"	17"	17"	17"	17"	17"	17"
Extreme Length of Brick-work.....	8' 6"	9' 6"	10' 6"	9' 6"	11' 0"	12' 6"	10' 6"	12' 0"	13' 6"	12' 6"	14' 0"	15' 6"	16' 0"	18' 6"	18' 0"	20' 6"	18' 6"	20' 6"	18' 6"	20' 6"
Extreme Width of Brick-work.....	67"	67"	67"	73"	73"	73"	79"	79"	79"	86"	86"	86"	92"	92"	98"	98"	108"	108"	120"	120"

TRIMMINGS—as listed, include: one Steam Gauge, one Water Column with three Gauge Cocks and Water Gauge; one Pop Safety Valve; one Automatic Draft Regulator. One Hoe and one Poker furnished with each Boiler.

Every Boiler fitted with a Safety Fusible Plug in Crown Sheet. Ash Pit Front provided with Special Lift Door for Automatic Regulator. Castings consist of Ash Pit Front, Fire Door and Frame, one large and four small Soot Doors and Frames, and Acme Shaking Grates.



# Ideal Cylindrical Steel Boilers



With part of jacket and fire bricking removed to show fire-box construction, tubes, etc.

For Low-Pressure heating only. Constructed of best materials obtainable; strength, thickness, and form of plates carefully determined; all plates sheared, punched, and flanged to standard forms and templets. Flanges are turned to a radius of not less than 2 inches—free from cracks, checks, or flaws. All machine-riveted, and plates are beveled before joining. Tubes of best lap-welded American manufacture; tube holes slightly counterbored, expanded, and beaded in neat and workmanlike manner. All flat surfaces of heads well supported by stay-rods and braces. Castings best quality; grates of improved pattern, rocking action. Each Boiler thoroughly steam and water tested before shipment.

The trimmings furnished are: One Automatic Regulator with lever, two weights, two pulleys and jack chain; one Pop Safety Valve; one Steam Gauge; one Drain Cock (but without piping between gauge and trap); one Water Column, tapped top and bottom for 1-inch water connections and equipped with water gauge, glass and rods, and  $3\frac{3}{8}$ -inch compression gauge cocks.

The Ash-Pit is provided on one side with a special Lift Door for attaching by chain to Automatic Regulator. When Boilers are ordered for water, additional return tubes are placed in the shell, but no Water Boiler trimmings are furnished. Sketch of waterappings desired should accompany order. List price of Water Boilers same as Steam.



# Ideal Cylindrical Steel Boilers for Low-Pressure Heating

No. of Boiler.....	1200	1500	1800	2200	2600	3000	3600	4500
Diameter of Shell ..... in.	48	48	48	54	54	54	54	54
Length over all ..... ft.	8 <sup>2</sup> / <sub>3</sub>	9 <sup>2</sup> / <sub>3</sub>	10 <sup>2</sup> / <sub>3</sub>	9 <sup>2</sup> / <sub>3</sub>	10 <sup>2</sup> / <sub>3</sub>	12 <sup>2</sup> / <sub>3</sub>	14 <sup>1</sup> / <sub>6</sub>	16 <sup>2</sup> / <sub>3</sub>
Height over all ..... in.	67	67	67	73	73	73	73	73
Length of Fire-Box..... "	30	30	30	36	36	42	48	54
Width of Fire-Box..... "	42	42	42	48	48	48	48	48
Size of Fire Doors..... "	13 x 22	13 x 22	13 x 22	13 x 22	13 x 22	13 x 22	13 x 22	13 x 22
Water Line height..... "	58	58	58	61 <sup>1</sup> / <sub>2</sub>	61 <sup>1</sup> / <sub>2</sub>	61 <sup>1</sup> / <sub>2</sub>	61 <sup>1</sup> / <sub>2</sub>	61 <sup>1</sup> / <sub>2</sub>
Steam Supply Flanges (2) .....	4	4	5	5	5	6	6	6
Steam Return Flange (1) .....	2 <sup>1</sup> / <sub>2</sub>	2 <sup>1</sup> / <sub>2</sub>	3	3	3	4	4	4
Water Supply and Return Flanges (2 each).....	4	4	5	5	5	6	6	6
Smoke Bonnet (inside) ..... in.	10 x 16	10 x 16	10 x 16	10 x 21	10 x 21	10 x 21	10 x 21	10 x 21
Approx. weight of Boiler ... lbs.	6000	6500	6800	7400	8300	9200	10000	11000
Approx. number of Fire- Brick required .....	240	240	240	300	300	320	340	360
Steam Rating ..... sq. ft.	1200	1500	1800	2200	2600	3000	3600	4500
Water Rating .....	2000	2500	3000	3600	4300	5000	6000	7500
Price, complete with cast- ings and trimmings .....	\$565.00	\$615.00	\$665.00	\$715.00	\$790.00	\$865.00	\$975.00	\$1,140.00

Orders for Boilers of this type should specify whether they are intended for use in connection with hard or soft coal as fuel. When required for government work or when specifications are to be complied with, a copy of the complete specifications, in so far as the Boiler is concerned, should accompany the order.

We do not furnish with these Boilers brass chains or pulleys, gate valves, piping, blow-off valves, and such other special parts or trimmings occasionally specified. No fire tools are supplied with these Boilers, except hoe and poker.

# Price List American Direct Radiators

Per Square Foot of Heating Surface. Subject to Change Without Notice

Height, inches.....	45	38	32	26	23	22	20	18	16	15	14	13
Price per square foot.....	42c	42c	46c	50c	53c	53c	57c	58c	60c	62c	64c	66c
<b>Single-Column:</b>												
Peerless, Single-Column, Steam and Water...	...	3	2½	2	1⅔	...	1½	...	...	...	...	...
Rococo, Single-Column, Steam and Water...	...	3	2½	2	1⅔	...	1½	...	...	...	...	...
<b>Two-Column:</b>												
Peerless, Two-Column, Steam and Water...	5	4	3⅓	2⅔	2⅓	...	2	...	...	1½	...	...
Rococo, Two-Column, Steam and Water...	5	4	3⅓	2⅔	2⅓	...	2	...	...	...	...	...
Verona, Steam and Water .....	...	4	3⅓	2⅔	...	...	2	...	...	...	...	...
<b>Three-Column:</b>												
Peerless, Three-Column, Steam and Water...	6	5	4½	3¾	...	3	...	2¼	...	...	...	...
Rococo, Three-Column, Steam and Water...	6	5	4½	3¾	...	3	...	2¼	...	...	...	...
<b>Four-Column:</b>												
Peerless, Four-Column, Steam or Water .....	10	8	6½	5	...	4	...	3	...	...	...	...
Rococo, Four-Column, Steam or Water .....	10	8	6½	5	...	4	...	3	...	...	...	...

# Price List American Direct Radiators—Continued

Per Square Foot of Heating Surface. Subject to Change Without Notice.

Height, inches.....	45	38	32	26	23	22	20	18	16	15	14	13
Price per square foot.....	42c	42c	46c	50c	53c	53c	57c	58c	60c	62c	64c	66c
<b>Flue and Window:</b>												
Ætna Flue, Steam or Water.....	...	...	...	...	...	...	6	5 $\frac{1}{3}$	4 $\frac{2}{3}$	...	4	3 $\frac{2}{3}$
Areal Sanitary Box-Base, prices on application..	...	...	...	...	...	...	...	...	...	...	...	...
Italian Flue, Steam and Water.....	...	7	5 $\frac{3}{4}$	4 $\frac{1}{2}$	...	...	3 $\frac{1}{4}$	...	...	...	...	...
Rococo Window, Steam or Water.....	...	...	...	...	...	...	5	...	3 $\frac{3}{4}$	...	...	3

The locations of the figures in the above columns in line with the names of Radiators indicate the heights in which the various patterns are made. The figures themselves represent the amount of heating surface contained in each height section.

## Rococo Wall Radiators

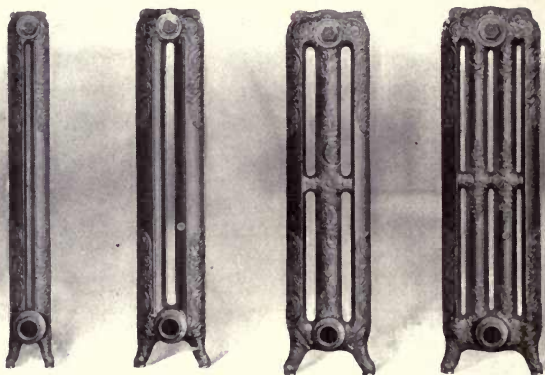
Extra large section, 9 square feet; Standard section, 7 square feet.....	Per Square Foot	42c
Small section, 5 square feet.....		46c

## Price List American Indirect Radiators

Excelsior, Steam and Water, 12 square feet.....	Per Square Foot	27c
Excelsior, Jr., Steam, 8 square feet.....		27c
Perfection Pin, Standard Size, Steam or Water, 10 square feet.....		27c
Sanitary School Pin, Steam or Water, 20 square feet.....		27c
Perfection Pin, Extra Large, Steam or Water, 15 square feet.....	Per Square Foot	27c
Cardinal, Steam or Water, 15 square feet.....		27c
Sterling, Steam or Water, 20 square feet.....		27c

Vento Heaters, Steam or Water.—Regular section, per sq. ft., 50c. Narrow section, per sq. ft., 53c.

## Radiator Variety and Groups



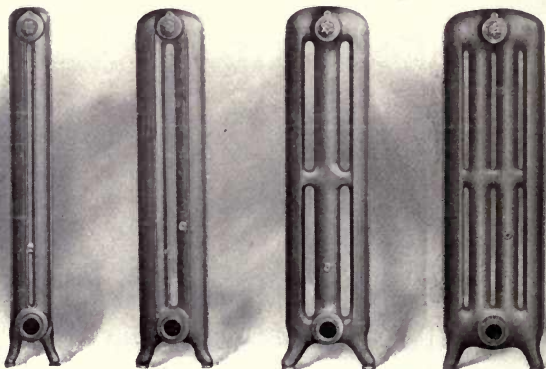
Rococo One-, Two-, Three- and Four-Column



Rococo Window



Rococo Wall



Peerless One-, Two-, Three- and Four-Column

# Radiator Variety and Groups

The leading general feature of AMERICAN Radiators is the unequaled variety of different shapes, sizes, and styles of ornamentation, in which they are made.

A reference to the pages noted below will indicate to what extent they are made up into odd shapes for special and irregular locations.

Our lines are also notable for a wide variety of artistic styles of ornamentation, which permit selections that harmonize with any of the modern popular styles of architectural finish or decoration. For instance, either the Renaissance, Rococo, Mission, Colonial or Empire styles of structure or wall ornamentation may be employed throughout a home, or several of these styles may be utilized in different rooms, and selections can be made from AMERICAN Radiators to harmonize with these decorations, varied or otherwise.

There are occasional instances where radiation is wanted in one style and in various widths for different parts of a building. Therefore, for the assistance of Architects, Engineers, Heating Contractors and Fitters, we herewith set forth the various typical groups of our Radiator products having more than one sectional construction, so that they may be more readily specified or selected for work requiring one pattern of uniform outlines or ornamentation, in different widths.

**Groups and Data**

Name	Construction	Width Inches	Width of Legs Inches	Pages
Rococo . . . . .	1-Column	4 ½	5 ½	56, 57
	2-Column	7 ¾	8 ½	58, 59
	3-Column	9 ¼	10	60, 61
	4-Column	10 ½	11 ¼	62, 63
	Window	12 ½	12 ½	80
	Wall	13 ¼	2 ¾ thick	107-109
Peerless . . . . .	1-Column	4 ½	5 ½	64, 65
	2-Column	7 ¾	8 ½	66, 67
	3-Column	9	10	68, 69
	4-Column	10 ½	11 ¼	70, 71



# Rococo Single-Column Radiators

For Steam and Water



Each section is  $4\frac{1}{2}$  inches wide. Width of legs,  $5\frac{1}{2}$  inches.

These Radiators are made in special shapes as follows:—

Concealed Brackets, for Steam or Water.....	see page 78
Circular, Steam and Water.....	see page 93
Corner, Steam and Water.....	see page 94
Curved, Steam and Water.....	see page 95
Legs, Extra High Solid, for Steam.....	see page 99
Marble-Top, with Saddles, for Steam and Water.....	see page 99

# Rococo Single-Column Radiators

For Steam and Water

No. of Sections	*Length 2½ inches per Sec.	HEATING SURFACE—SQUARE FEET				
		38-in. Height 3 sq. ft. per Sec.	32-in. Height 2½ sq. ft. per Sec.	26-in. Height 2 sq. ft. per Sec.	23-in. Height 1¾ sq. ft. per Sec.	20-in. Height 1½ sq. ft. per Sec.
2	5	6	5	4	3⅓	3
3	7½	9	7½	6	5	4½
4	10	12	10	8	6⅔	6
5	12½	15	12½	10	8⅓	7½
6	15	18	15	12	10	9
7	17½	21	17½	14	11⅔	10½
8	20	24	20	16	13⅓	12
9	22½	27	22½	18	15	13½
10	25	30	25	20	16⅔	15
11	27½	33	27½	22	18⅓	16½
12	30	36	30	24	20	18
13	32½	39	32½	26	21⅔	19½
14	35	42	35	28	23⅓	21
15	37½	45	37½	30	25	22½
16	40	48	40	32	26⅔	24
17	42½	51	42½	34	28⅓	25½
18	45	54	45	36	30	27
19	47½	57	47½	38	31⅔	28½
20	50	60	50	40	33⅓	30
21	52½	63	52½	42	35	31½
22	55	66	55	44	36⅔	33
23	57½	69	57½	46	38⅓	34½
24	60	72	60	48	40	36
25	62½	75	62½	50	41⅔	37½
26	65	78	65	52	43⅓	39
27	67½	81	67½	54	45	40½
28	70	84	70	56	46⅔	42
29	72½	87	72½	58	48⅓	43½
30	75	90	75	60	50	45
31	77½	93	77½	62	51⅔	46½
32	80	96	80	64	53⅓	48

These Radiators for Steam and Water are tapped 2 inches and bushed as per list on page 105.

Single-Column Radiators for Steam are connected with right-hand threaded, extra-heavy nipples; for Water, extra-heavy right and left threaded nipples at top and bottom. For one-pipe Steam work the supply-leg section is constructed with low drip hub, and for two-pipe Steam work the return-leg section is constructed with low drip hub.

For distance from floor to center of tapping and distances between centers of upper and lower tapings, etc., see page 104.

\*In estimating length of this Radiator allow ½ inch for each bushing.

# Rococo Two-Column Radiators

For Steam and Water



Each section is  $7\frac{3}{8}$  inches wide. Width of legs,  $8\frac{1}{2}$  inches.

Rococo Two-Column Radiators are made in special shapes as follows:—

Circular, Steam and Water..... see pages 91 to 93  
Corner, Steam and Water.....see pages 94 and 97  
Curved, Steam and Water.....see page 95  
Legs, Extra High Solid, for Steam.....see page 99  
Marble-Top, with Saddles, for Steam and Water.....see page 99  
Concealed Brackets, for Steam and Water (Detroit and Pierce) see page 101

# Rococo Two-Column Radiators

For Steam and Water

No. of Sections	* Length 2½ in. per Sec.	HEATING SURFACE—SQUARE FEET					
		45-in. Height 5 sq. ft. per Sec.	38-in. Height 4 sq. ft. per Sec.	32-in. Height 3⅓ sq. ft. per Sec.	26-in. Height 2⅔ sq. ft. per Sec.	23-in. Height 2⅓ sq. ft. per Sec.	20-in. Height 2 sq. ft. per Sec.
2	5	10	8	6⅔	5⅓	4⅔	4
3	7½	15	12	10	8	7	6
4	10	20	16	13⅓	10⅔	9⅓	8
5	12½	25	20	16⅔	13⅓	11⅔	10
6	15	30	24	20	16	14	12
7	17½	35	28	23⅓	18⅔	16⅓	14
8	20	40	32	26⅔	21⅓	18⅔	16
9	22½	45	36	30	24	21	18
10	25	50	40	33⅓	26⅔	23⅓	20
11	27½	55	44	36⅔	29⅓	25⅔	22
12	30	60	48	40	32	28	24
13	32½	65	52	43⅓	34⅔	30⅓	26
14	35	70	56	46⅔	37⅓	32⅔	28
15	37½	75	60	50	40	35	30
16	40	80	64	53⅓	42⅔	37⅓	32
17	42½	85	68	56⅔	45⅓	39⅔	34
18	45	90	72	60	48	42	36
19	47½	95	76	63⅓	50⅔	44⅓	38
20	50	100	80	66⅔	53⅓	46⅔	40
21	52½	105	84	70	56	49	42
22	55	110	88	73⅓	58⅔	51⅓	44
23	57½	115	92	76⅔	61⅓	53⅔	46
24	60	120	96	80	64	56	48
25	62½	125	100	83⅓	66⅔	58⅓	50
26	65	130	104	86⅔	69⅓	60⅔	52
27	67½	135	108	90	72	63	54
28	70	140	112	93⅓	74⅔	65⅓	56
29	72½	145	116	96⅔	77⅓	67⅔	58
30	75	150	120	100	80	70	60
31	77½	155	124	103⅓	82⅔	72⅓	62
32	80	160	128	106⅔	85⅓	74⅔	64

Above Radiators are tapped 2 inches and bushed as per list on page 105.

Connected at bottom at Detroit Plant with extra-heavy right- and left threaded nipples; at all other plants with extra-heavy right-hand threaded nipples for Steam. Made for water with extra-heavy right- and left-hand threaded nipples at top and bottom.

For one-pipe Steam work the supply-leg section is constructed with low drip hub, and for two-pipe Steam work return-leg section has low drip hub.

For distance from floor to center of tapping, and distances between centers of upper and lower tapplings, etc., see page 104.

\* In estimating length of this Radiator allow ½ inch for each bushing.



# Rococo Three-Column Radiators

For Steam and Water



Each section is  $9\frac{1}{4}$  inches wide. Width of legs, 10 inches.

Made at Detroit Plant in special shapes and on special orders as follows:—

Circular, for Steam and Water.....	see pages 91 to 93
Corner, for Steam and Water.....	see pages 94 and 96
Curved, for Steam and Water .....	see page 95
Hot Closet, for Steam and Water.....	see page 89
Ventilating.....	see pages 86 and 87
Legs, Detachable High, for Steam and Water .....	see page 98
Legs, Extra High Solid, Steam and Water (Pierce Plant) ..	see page 99
Marble-Top Lugs, for Steam and Water.....	see page 99
Marble-Top Saddles, for Steam and Water (Pierce Plant) ..	see page 99
Concealed Brackets, Steam and Water (Detroit and Pierce) ..	page 101



# Rococo Three-Column Radiators

For Steam and Water

No. of Sections	* Length 2½ in. per Sec.	HEATING SURFACE—SQUARE FEET					
		45-in. Height, 6 sq. ft. per Sec.	38-in. Height, 5 sq. ft. per Sec.	32-in. Height, 4½ sq. ft. per Sec.	26-in. Height, 3¾ sq. ft. per Sec.	22-in. Height, 3 sq. ft. per Sec.	18-in. Height, 2¼ sq. ft. per Sec.
2	5	12	10	9	7½	6	4½
3	7½	18	15	13½	11¼	9	6¾
4	10	24	20	18	15	12	9
5	12½	30	25	22½	18¾	15	11¼
6	15	36	30	27	22½	18	13½
7	17½	42	35	31½	26¼	21	15¾
8	20	48	40	36	30	24	18
9	22½	54	45	40½	33¾	27	20¼
10	25	60	50	45	37½	30	22½
11	27½	66	55	49½	41¼	33	24¾
12	30	72	60	54	45	36	27
13	32½	78	65	58½	48¾	39	29¼
14	35	84	70	63	52½	42	31½
15	37½	90	75	67½	56¼	45	33¾
16	40	96	80	72	60	48	36
17	42½	102	85	76½	63¾	51	38¼
18	45	108	90	81	67½	54	40½
19	47½	114	95	85½	71¼	57	42¾
20	50	120	100	90	75	60	45
21	52½	126	105	94½	78¾	63	47¼
22	55	132	110	99	82½	66	49½
23	57½	138	115	103½	86¼	69	51¾
24	60	144	120	108	90	72	54
25	62½	150	125	112½	93¾	75	56¼
26	65	156	130	117	97½	78	58½
27	67½	162	135	121½	101¼	81	60¾
28	70	168	140	126	105	84	63
29	72½	174	145	130½	108¾	87	65¼
30	75	180	150	135	112½	90	67½
31	77½	186	155	139½	116¼	93	69¾
32	80	192	160	144	120	96	72

Above Radiators are tapped 2 inches and bushed as per list on page 105.

All Water Rococo Radiators are connected with extra-heavy malleable right and left threaded nipples. Rococo Steam Radiators from Detroit Plant are connected with extra-heavy malleable right and left threaded nipples; at all other plants right-hand threaded nipples are used. For one-pipe Steam work the supply-leg section is constructed with low drip hub, and for two-pipe Steam work the return-leg section has low drip hub.

For distance floor to center of tapping and distances between centers of upper and lower tappings, etc., see page 104.

\* In estimating length of Radiator, allow ½ inch for each bushing.

# Rococo Four-Column Radiators

For Steam or Water



Each section is  $10\frac{1}{2}$  inches wide.

Width of legs,  $11\frac{1}{4}$  inches.

This pattern of Radiators is not made in any special or odd shapes, other than that same can be furnished with Saddles for Marble-Top; see page 99.

# Rococo Four-Column Radiators

For Steam or Water

No. of Sec- tions	* Length 3 in. per Sec.	HEATING SURFACE—SQUARE FEET.					
		45-in. Height 10 sq. ft. per Sec.	38-in. Height 8 sq. ft. per Sec.	32-in. Height 6½ sq. ft. per Sec.	26-in. Height 5 sq. ft. per Sec.	22-in. Height 4 sq. ft. per Sec.	18-in. Height 3 sq. ft. per Sec.
2	6	20	16	13	10	8	6
3	9	30	24	19½	15	12	9
4	12	40	32	26	20	16	12
5	15	50	40	32½	25	20	15
6	18	60	48	39	30	24	18
7	21	70	56	45½	35	28	21
8	24	80	64	52	40	32	24
9	27	90	72	58½	45	36	27
10	30	100	80	65	50	40	30
11	33	110	88	71½	55	44	33
12	36	120	96	78	60	48	36
13	39	130	104	84½	65	52	39
14	42	140	112	91	70	56	42
15	45	150	120	97½	75	60	45
16	48	160	128	104	80	64	48
17	51	170	136	110½	85	68	51
18	54	180	144	117	90	72	54
19	57	190	152	123½	95	76	57
20	60	200	160	130	100	80	60
21	63	210	168	136½	105	84	63
22	66	220	176	143	110	88	66
23	69	230	184	149½	115	92	69
24	72	240	192	156	120	96	72
25	75	250	200	162½	125	100	75
26	78	260	208	169	130	104	78
27	81	270	216	175½	135	108	81
28	84	280	224	182	140	112	84
29	87	290	232	188½	145	116	87
30	90	300	240	195	150	120	90
31	93	310	248	201½	155	124	93
32	96	320	256	208	160	128	96

Above Radiators are tapped 2 inches, and bushed as per list on page 105.

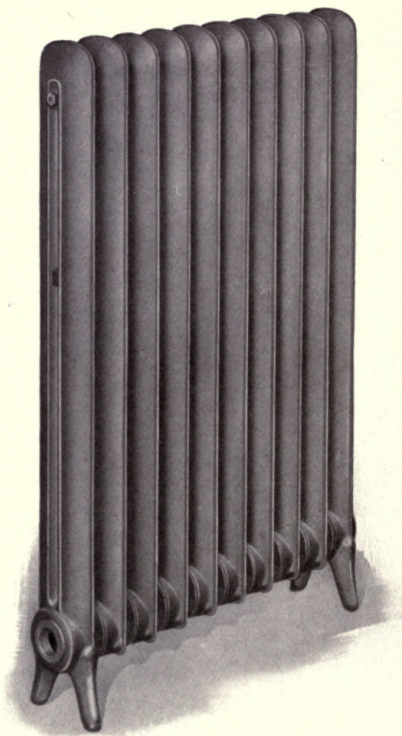
Connected at top and bottom with extra-heavy right and left nipples.

For distance from floor to center of tapping, and distances between centers of upper and lower tappings, see page 104.

\* In estimating length of Radiator, allow ½ inch for each bushing.

# Peerless Single-Column Radiators

For Steam and Water



Each section is  $4\frac{1}{2}$  inches wide. Width of legs,  $5\frac{1}{2}$  inches.

This pattern of Single-Column Radiators is made in special shapes as follows:—

Circular, for Steam and Water .....see pages 91 to 93  
Concealed Brackets, for Steam or Water .....see page 78  
Corner, for Steam and Water .....see pages 94 and 97  
Curved, for Steam and Water .....see page 95  
Legs, Extra High Solid, for Steam .....see page 99  
Marble-Top, with Saddles, for Steam and Water .....see page 99

# Peerless Single-Column Radiators

For Steam and Water

No. of Sec- tions	* Length 2½ in. per Sec.	HEATING SURFACE—SQUARE FEET.				
		38-in. Height 3 sq. ft. per Sec.	32-in. Height 2½ sq. ft. per Sec.	26-in. Height 2 sq. ft. per Sec.	23-in. Height 1⅔ sq. ft. per Sec.	20 in. Height 1½ sq. ft. per Sec.
2	5	6	5	4	3⅓	3
3	7½	9	7½	6	5	4½
4	10	12	10	8	6⅔	6
5	12½	15	12½	10	8⅓	7½
6	15	18	15	12	10	9
7	17½	21	17½	14	11⅔	10½
8	20	24	20	16	13⅓	12
9	22½	27	22½	18	15	13½
10	25	30	25	20	16⅔	15
11	27½	33	27½	22	18⅓	16½
12	30	36	30	24	20	18
13	32½	39	32½	26	21⅔	19½
14	35	42	35	28	23⅓	21
15	37½	45	37½	30	25	22½
16	40	48	40	32	26⅔	24
17	42½	51	42½	34	28⅓	25½
18	45	54	45	36	30	27
19	47½	57	47½	38	31⅔	28½
20	50	60	50	40	33⅓	30
21	52½	63	52½	42	35	31½
22	55	66	55	44	36⅔	33
23	57½	69	57½	46	38⅓	34½
24	60	72	60	48	40	36
25	62½	75	62½	50	41⅔	37½
26	65	78	65	52	43⅓	39
27	67½	81	67½	54	45	40½
28	70	84	70	56	46⅔	42
29	72½	87	72½	58	48⅓	43½
30	75	90	75	60	50	45
31	77½	93	77½	62	51⅔	46½
32	80	96	80	64	53⅓	48

These Radiators tapped 2 inches and bushed as per list on page 105.

Single-Column Radiators for Steam are connected with right-hand threaded extra-heavy nipples; for Water, extra-heavy right and left threaded nipples at top and bottom.

For one-pipe Steam work the supply-leg section is constructed with low drip hub, and for two-pipe Steam work the return-leg section is constructed with low drip hub.

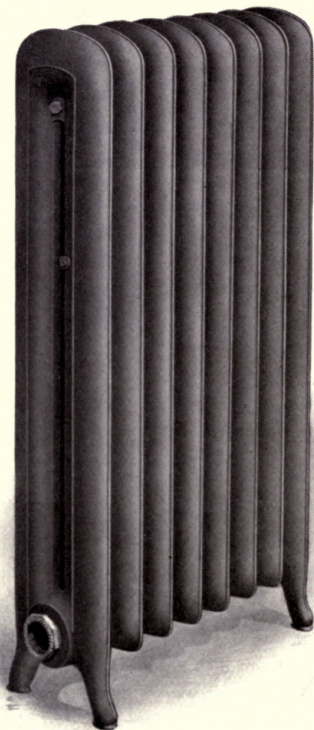
For distance from floor to center of tapping and for distances between centers of upper and lower tapplings, etc., see page 104.

\*In estimating length of this Radiator allow ½ inch for each bushing.



# Peerless Two-Column Radiators

For Steam and Water



Each section is  $7\frac{3}{8}$  inches wide. Width of legs,  $8\frac{1}{2}$  inches.

Peerless Two-Column Radiators are made in special shapes as follows:

Circular, for Steam and Water.....see pages 91 to 93  
Corner, for Steam and Water.....see pages 94 and 97  
Curved, for Steam and Water..... see page 95  
Legs, Extra High Solid, for Steam.....see page 99  
Marble-Top, with Saddles, for Steam and Water.....see page 99

# Peerless Two-Column Radiators

For Steam and Water

No. of Sec.	* Length 2½-in. per Sec.	HEATING SURFACE—SQUARE FEET						
		45-in. Height. 5 sq. ft. per Sec.	38-in. Height. 4 sq. ft. per Sec.	32-in. Height. 3½ sq. ft. per Sec.	26-in. Height. 2½ sq. ft. per Sec.	23-in. Height. 2½ sq. ft. per Sec.	20-in. Height. 2 sq. ft. per Sec.	†15-in. Height. 1½ sq. ft. per Sec.
2	5	10	8	6⅔	5⅓	4⅔	4	3
3	7½	15	12	10	8	7	6	4½
4	10	20	16	13⅓	10⅔	9⅓	8	6
5	12½	25	20	16⅔	13⅓	11⅔	10	7½
6	15	30	24	20	16	14	12	9
7	17½	35	28	23⅓	18⅔	16⅓	14	10½
8	20	40	32	26⅔	21⅓	18⅔	16	12
9	22½	45	36	30	24	21	18	13½
10	25	50	40	33⅓	26⅔	23⅓	20	15
11	27½	55	44	36⅔	29⅓	25⅔	22	16½
12	30	60	48	40	32	28	24	18
13	32½	65	52	43⅓	34⅔	30⅓	26	19½
14	35	70	56	46⅔	37⅓	32⅔	28	21
15	37½	75	60	50	40	35	30	22½
16	40	80	64	53⅓	42⅔	37⅓	32	24
17	42½	85	68	56⅔	45⅓	39⅔	34	25½
18	45	90	72	60	48	42	36	27
19	47½	95	76	63⅓	50⅔	44⅓	38	28½
20	50	100	80	66⅔	53⅓	46⅔	40	30
21	52½	105	84	70	56	49	42	31½
22	55	110	88	73⅓	58⅔	51⅓	44	33
23	57½	115	92	76⅔	61⅓	53⅔	46	34½
24	60	120	96	80	64	56	48	36
25	62½	125	100	83⅓	66⅔	58⅓	50	37½
26	65	130	104	86⅔	69⅓	60⅔	52	39
27	67½	135	108	90	72	63	54	40½
28	70	140	112	93⅓	74⅔	65⅓	56	42
29	72½	145	116	96⅔	77⅓	67⅔	58	43½
30	75	150	120	100	80	70	60	45
31	77½	155	124	103⅓	82⅔	72⅓	62	46½
32	80	160	128	106⅔	85⅓	74⅔	64	48

Above Radiators are tapped 2 inches and bushed as per list on page 105.

For distance from floor to center of tapping, and distances between centers of upper and lower tappings, etc., see page 104.

Connected at top and bottom with extra-heavy right and left threaded nipples for Water; and extra-heavy right-hand threaded nipples at bottom at Pierce Plant and with extra-heavy right and left threaded nipples at Detroit Plant for Steam. For one-pipe Steam work the supply-leg section is constructed with low drip hub, and for two-pipe Steam work the return-leg section is constructed with low drip hub.

\*In estimating length of Radiator, allow ½ inch for each bushing. †15-inch height is not made for Water.

# Peerless Three-Column Radiators

For Steam and Water



Each section is 9-inches wide. Width of legs, 10 inches.

Peerless Three-Column Radiators are made in special shapes as follows:—

Circular, for Steam and Water.....see pages 91 to 93  
Corner, for Steam and Water.....see page 94  
Curved, for Steam and Water .....see page 95  
Marble-Top Lugs, for Steam and Water.....see page 99

# Peerless Three-Column Radiators

For Steam and Water

No. of Sec- tions	* Length 2½ in. per Sec.	HEATING SURFACE—SQUARE FEET					
		45-in. Height 6 sq. ft. per Sec.	38-in. Height 5 sq. ft. per Sec.	32-in. Height 4½ sq. ft. per Sec.	26-in. Height 3¾ sq. ft. per Sec.	22-in. Height 3 sq. ft. per Sec.	18-in. Height 2¼ sq. ft. per Sec.
2	5	12	10	9	7½	6	4½
3	7½	18	15	13½	11¼	9	6¾
4	10	24	20	18	15	12	9
5	12½	30	25	22½	18¾	15	11¼
6	15	36	30	27	22½	18	13½
7	17½	42	35	31½	26¼	21	15¾
8	20	48	40	36	30	24	18
9	22½	54	45	40½	33¾	27	20¼
10	25	60	50	45	37½	30	22½
11	27½	66	55	49½	41¼	33	24¾
12	30	72	60	54	45	36	27
13	32½	78	65	58½	48¾	39	29¼
14	35	84	70	63	52½	42	31½
15	37½	90	75	67½	56¼	45	33¾
16	40	96	80	72	60	48	36
17	42½	102	85	76½	63¾	51	38¼
18	45	108	90	81	67½	54	40½
19	47½	114	95	85½	71¼	57	42¾
20	50	120	100	90	75	60	45
21	52½	126	105	94½	78¾	63	47¼
22	55	132	110	99	82½	66	49½
23	57½	138	115	103½	86¼	69	51¾
24	60	144	120	108	90	72	54
25	62½	150	125	112½	93¾	75	56¼
26	65	156	130	117	97½	78	58½
27	67½	162	135	121½	101¼	81	60¾
28	70	168	140	126	105	84	63
29	72½	174	145	130½	108¾	87	65¼
30	75	180	150	135	112½	90	67½
31	77½	186	155	139½	116¼	93	69¾
32	80	192	160	144	120	96	72

Above Radiators are tapped 2 inches and bushed as per list on page 105.

For distance from floor to center of tapping, and distances between centers of upper and lower tapings, etc., see page 104.

For Water, connected with extra-heavy right and left threaded nipples at top and bottom; for Steam, with extra-heavy right and left threaded nipples.

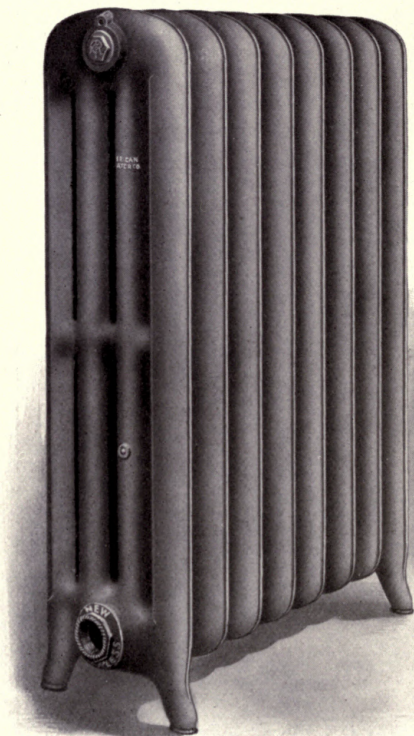
For one-pipe Steam work the supply-leg section has low drip hub; and for two-pipe Steam work the return-leg section has low drip hub.

\*In estimating length of Radiator allow ½ inch for each bushing.



# Peerless Four-Column Radiators

For Steam or Water



Each section is  $10\frac{1}{2}$  inches wide.

Width of legs,  $11\frac{1}{4}$  inches.

This pattern of Radiators is not made in any special or odd shapes, but can be furnished with Saddles for Marble-Top; see page 99

All American Direct Radiators are connected with right- and left-hand threaded nipples, having 60-degree threads (U. S. Standard) which insure a joint which is tight, strong and reliable.



# Peerless Four-Column Radiators

For Steam or Water

No. of Sections	* Length 3 in. per Sec.	HEATING SURFACE— SQUARE FEET					
		45-in. Height 10 sq. ft. per Sec.	38-in. Height 8 sq. ft. per Sec.	32-in. Height 6½ sq. ft. per Sec.	26-in. Height 5 sq. ft. per Sec.	22-in. Height 4 sq. ft. per Sec.	18-in. Height 3 sq. ft. per Sec.
2	6	20	16	13	10	8	6
3	9	30	24	19½	15	12	9
4	12	40	32	26	20	16	12
5	15	50	40	32½	25	20	15
6	18	60	48	39	30	24	18
7	21	70	56	45½	35	28	21
8	24	80	64	52	40	32	24
9	27	90	72	58½	45	36	27
10	30	100	80	65	50	40	30
11	33	110	88	71½	55	44	33
12	36	120	96	78	60	48	36
13	39	130	104	84½	65	52	39
14	42	140	112	91	70	56	42
15	45	150	120	97½	75	60	45
16	48	160	128	104	80	64	48
17	51	170	136	110½	85	68	51
18	54	180	144	117	90	72	54
19	57	190	152	123½	95	76	57
20	60	200	160	130	100	80	60
21	63	210	168	136½	105	84	63
22	66	220	176	143	110	88	66
23	69	230	184	149½	115	92	69
24	72	240	192	156	120	96	72
25	75	250	200	162½	125	100	75
26	78	260	208	169	130	104	78
27	81	270	216	175½	135	108	81
28	84	280	224	182	140	112	84
29	87	290	232	188½	145	116	87
30	90	300	240	195	150	120	90
31	93	310	248	201½	155	124	93
32	96	320	256	208	160	128	96

Above Radiators are tapped 2 inches, and bushed as per list on page 105.

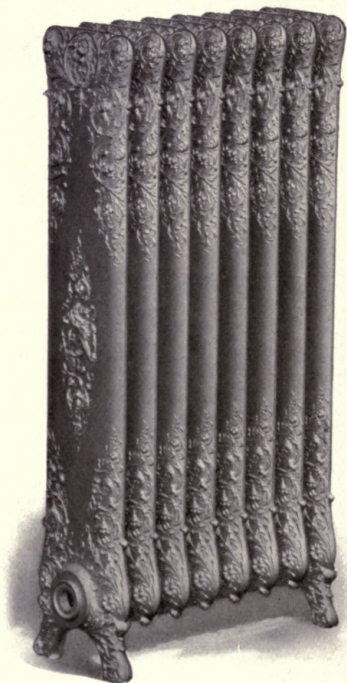
For distance from floor to center of tapping, and distances between centers of upper and lower tapings, etc., see page 104.

Connected at top and bottom with extra-heavy right and left nipples.

\*In estimating length of Radiator, allow ½ inch for each bushing.

# Verona Steam and Water Radiators

Patented Nov. 3, 1896



Each section is 8 inches wide. Width of legs,  $8\frac{1}{2}$  inches.

Verona Radiators are made in special shapes as follows:—

Curved, for Steam and Water.....see page 95  
Corner, for Steam and Water.....see pages 94 and 96  
Legs, Detachable High, for Steam and Water .....see page 98  
Marble-Top, with Lugs, for Steam and Water.....see page 99

All American Direct Radiators are connected with right- and left-hand threaded nipples having 60 degree threads (U. S. Standard) which insure a joint which is tight, strong and reliable.

# Verona Steam and Water Radiators

No. of Sections	* Length 2½ in. per Sec.	HEATING SURFACE—SQUARE FEET			
		38-in. Height 4 sq. ft. per Sec.	32-in. Height 3½ sq. ft. per Sec.	26-in. Height 2⅔ sq. ft. per Sec.	20-in. Height 2 sq. ft. per Sec.
2	5	8	6⅔	5⅓	4
3	7½	12	10	8	6
4	10	16	13⅓	10⅔	8
5	12½	20	16⅔	13⅓	10
6	15	24	20	16	12
7	17½	28	23⅓	18⅔	14
8	20	32	26⅔	21⅓	16
9	22½	36	30	24	18
10	25	40	33⅓	26⅔	20
11	27½	44	36⅔	29⅓	22
12	30	48	40	32	24
13	32½	52	43⅓	34⅔	26
14	35	56	46⅔	37⅓	28
15	37½	60	50	40	30
16	40	64	53⅓	42⅔	32
17	42½	68	56⅔	45⅓	34
18	45	72	60	48	36
19	47½	76	63⅓	50⅔	38
20	50	80	66⅔	53⅓	40
21	52½	84	70	56	42
22	55	88	73⅓	58⅔	44
23	57½	92	76⅔	61⅓	46
24	60	96	80	64	48
25	62½	100	83⅓	66⅔	50
26	65	104	86⅔	69⅓	52
27	67½	108	90	72	54
28	70	112	93⅓	74⅔	56
29	72½	116	96⅔	77⅓	58
30	75	120	100	80	60
31	77½	124	103⅓	82⅔	62
32	80	128	106⅔	85⅓	64

The Verona Radiator is tapped 2 inches, and bushed as per regular list on page 105.

For distance from floor to center of tapping, and distances between centers of upper and lower tapplings, etc., see page 104.

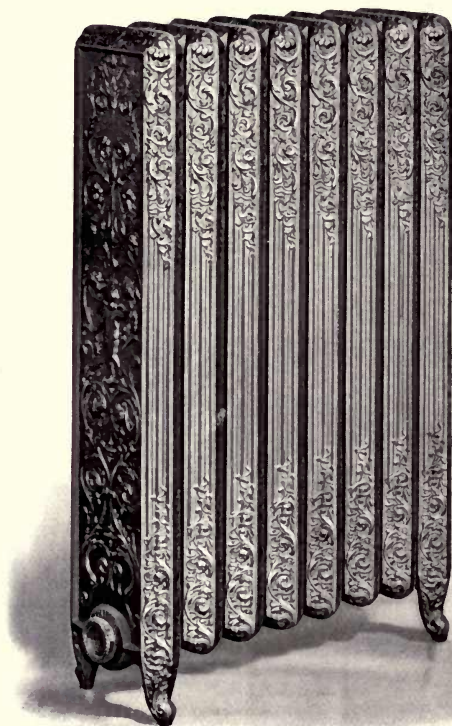
Top of each Verona Water leg section has 1½-inch plug, which can be taken out to make top connection when desired.

For Steam, connected with extra-heavy right- and left-hand threaded nipples; for Water, with extra-heavy right- and left-hand threaded nipples top and bottom. For one-pipe Steam work the supply-leg section is constructed with low drip hub and for two-pipe Steam work the return-leg section is constructed with low drip hub.

\* In estimating length of Radiator allow ½ inch for each bushing.

# Italian Flue Ornamental Radiators

For Steam and Water



Patented October 20, 1896

Each section is  $8\frac{1}{2}$  inches wide. Width of legs,  $8\frac{1}{2}$  inches

Italian Flue Radiators are made in special shapes as follows:

- Corner, for Steam and Water.....see pages 94 and 97
- Curved, for Steam and Water.....see page 95
- Legs, Detachable, High, for Steam and Water.....see page 98
- Marble-Top Lugs, for Steam and Water.....see page 99

# Italian Flue Ornamental Radiators

For Steam and Water

No. of Sections	* Length 3 in. per Sec.	HEATING SURFACE—SQUARE FEET			
		38-in. Height 7 sq. ft. per Sec.	32-in. Height 5¾ sq. ft. per Sec.	26-in. Height 4½ sq. ft. per Sec.	20-in. Height 3¼ sq. ft. per Sec.
2	6	14	11 ½	9	6 ½
3	9	21	17 ¼	13 ½	9 ¾
4	12	28	23	18	13
5	15	35	28 ¾	22 ½	16 ¼
6	18	42	34 ½	27	19 ½
7	21	49	40 ¼	31 ½	22 ¾
8	24	56	46	36	26
9	27	63	51 ¾	40 ½	29 ¼
10	30	70	57 ½	45	32 ½
11	33	77	63 ¼	49 ½	35 ¾
12	36	84	69	54	39
13	39	91	74 ¾	58 ½	42 ¼
14	42	98	80 ½	63	45 ½
15	45	105	86 ¼	67 ½	48 ¾
16	48	112	92	72	52
17	51	119	97 ¾	76 ½	55 ¼
18	54	126	103 ½	81	58 ½
19	57	133	109 ¼	85 ½	61 ¾
20	60	140	115	90	65
21	63	147	120 ¾	94 ½	68 ¼
22	66	154	126 ½	99	71 ½
23	69	161	132 ¼	103 ½	74 ¾
24	72	168	138	108	78
25	75	175	143 ¾	112 ½	81 ¼
26	78	182	149 ½	117	84 ½
27	81	189	155 ¼	121 ½	87 ¾
28	84	196	161	126	91
29	87	203	166 ¾	130 ½	94 ¼
30	90	210	172 ½	135	97 ½
31	93	217	178 ¼	139 ½	100 ¾
32	96	224	184	144	104

Above Radiators are tapped 2 inches, and bushed as per list on page 105.

For distance from floor to center of supply tapping, and distances between centers of upper and lower tappings, etc., see page 104.

Connected with extra-heavy right- and left-hand threaded nipples.

For one-pipe Steam work the supply-leg section is constructed with low drip hub, and for two-pipe Steam work the return-leg section is constructed with low drip hub.

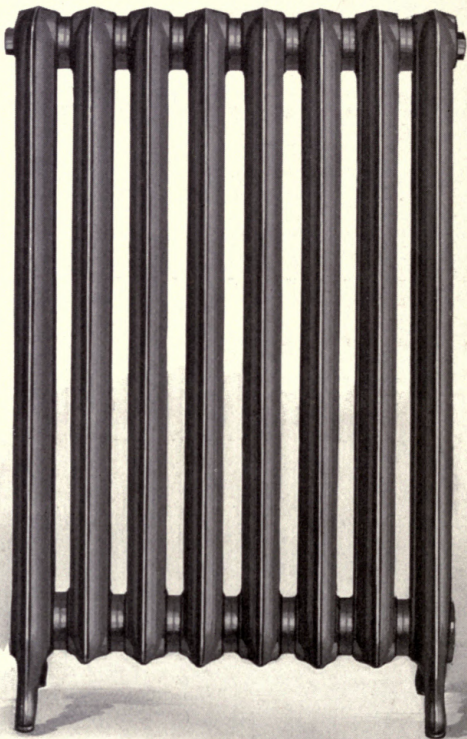
Leg section of Italian Flue Water Radiator has 1½-inch plug at top, which can be taken out to make top connection when desired.

\* In estimating length of Radiator allow ½ inch for each bushing.



# Peerless Two-Col. Hospital Radiators

For Steam and Water



Each section is  $7\frac{3}{8}$  inches wide. Width of legs,  $8\frac{1}{2}$  inches.

Not made in any special shapes. Sections have 3-inch centers.

Made specially for hospitals, sanitariums, and all buildings where a Radiator having separated sections, easily cleaned, supplies the need of a heating surface which meets all the sanitary demands of such institutions.

# Peerless Two-Col. Hospital Radiators

## For Steam and Water

No. of Sec- tions	Length 3-in. per Sec.	HEATING SURFACE—SQUARE FEET					
		45-in. Height. 5 sq. ft. per Sec.	38-in. Height. 4 sq. ft. per Sec.	32-in. Height. 3½ sq. ft. per Sec.	26-in. Height. 2½ sq. ft. per Sec.	23-in. Height. 2½ sq. ft. per Sec.	20-in. Height. 2 sq. ft. per Sec.
2	6	10	8	6 <sup>2</sup> / <sub>3</sub>	5 <sup>1</sup> / <sub>3</sub>	4 <sup>2</sup> / <sub>3</sub>	4
3	9	15	12	10	8	7	6
4	12	20	16	13 <sup>1</sup> / <sub>3</sub>	10 <sup>2</sup> / <sub>3</sub>	9 <sup>1</sup> / <sub>3</sub>	8
5	15	25	20	16 <sup>2</sup> / <sub>3</sub>	13 <sup>1</sup> / <sub>3</sub>	11 <sup>2</sup> / <sub>3</sub>	10
6	18	30	24	20	16	14	12
7	21	35	28	23 <sup>1</sup> / <sub>3</sub>	18 <sup>2</sup> / <sub>3</sub>	16 <sup>1</sup> / <sub>3</sub>	14
8	24	40	32	26 <sup>2</sup> / <sub>3</sub>	21 <sup>1</sup> / <sub>3</sub>	18 <sup>2</sup> / <sub>3</sub>	16
9	27	45	36	30	24	21	18
10	30	50	40	33 <sup>1</sup> / <sub>3</sub>	26 <sup>2</sup> / <sub>3</sub>	23 <sup>1</sup> / <sub>3</sub>	20
11	33	55	44	36 <sup>2</sup> / <sub>3</sub>	29 <sup>1</sup> / <sub>3</sub>	25 <sup>2</sup> / <sub>3</sub>	22
12	36	60	48	40	32	28	24
13	39	65	52	43 <sup>1</sup> / <sub>3</sub>	34 <sup>2</sup> / <sub>3</sub>	30 <sup>1</sup> / <sub>3</sub>	26
14	42	70	56	46 <sup>2</sup> / <sub>3</sub>	37 <sup>1</sup> / <sub>3</sub>	32 <sup>2</sup> / <sub>3</sub>	28
15	45	75	60	50	40	35	30
16	48	80	64	53 <sup>1</sup> / <sub>3</sub>	42 <sup>2</sup> / <sub>3</sub>	37 <sup>1</sup> / <sub>3</sub>	32
17	51	85	68	56 <sup>2</sup> / <sub>3</sub>	45 <sup>1</sup> / <sub>3</sub>	39 <sup>2</sup> / <sub>3</sub>	34
18	54	90	72	60	48	42	36
19	57	95	76	63 <sup>1</sup> / <sub>3</sub>	50 <sup>2</sup> / <sub>3</sub>	44 <sup>1</sup> / <sub>3</sub>	38
20	60	100	80	66 <sup>2</sup> / <sub>3</sub>	53 <sup>1</sup> / <sub>3</sub>	46 <sup>2</sup> / <sub>3</sub>	40
21	63	105	84	70	56	49	42
22	66	110	88	73 <sup>1</sup> / <sub>3</sub>	58 <sup>2</sup> / <sub>3</sub>	51 <sup>1</sup> / <sub>3</sub>	44
23	69	115	92	76 <sup>2</sup> / <sub>3</sub>	61 <sup>1</sup> / <sub>3</sub>	53 <sup>2</sup> / <sub>3</sub>	46
24	72	120	96	80	64	56	48
25	75	125	100	83 <sup>1</sup> / <sub>3</sub>	66 <sup>2</sup> / <sub>3</sub>	58 <sup>1</sup> / <sub>3</sub>	50
26	78	130	104	86 <sup>2</sup> / <sub>3</sub>	69 <sup>1</sup> / <sub>3</sub>	60 <sup>2</sup> / <sub>3</sub>	52
27	81	135	108	90	72	63	54
28	84	140	112	93 <sup>1</sup> / <sub>3</sub>	74 <sup>2</sup> / <sub>3</sub>	65 <sup>1</sup> / <sub>3</sub>	56
29	87	145	116	96 <sup>2</sup> / <sub>3</sub>	77 <sup>1</sup> / <sub>3</sub>	67 <sup>2</sup> / <sub>3</sub>	58
30	90	150	120	100	80	70	60
31	93	155	124	103 <sup>1</sup> / <sub>3</sub>	82 <sup>2</sup> / <sub>3</sub>	72 <sup>1</sup> / <sub>3</sub>	62
32	96	160	128	106 <sup>2</sup> / <sub>3</sub>	85 <sup>1</sup> / <sub>3</sub>	74 <sup>2</sup> / <sub>3</sub>	64

Above Radiators are tapped 2 inches, and bushed as per list on page 105.

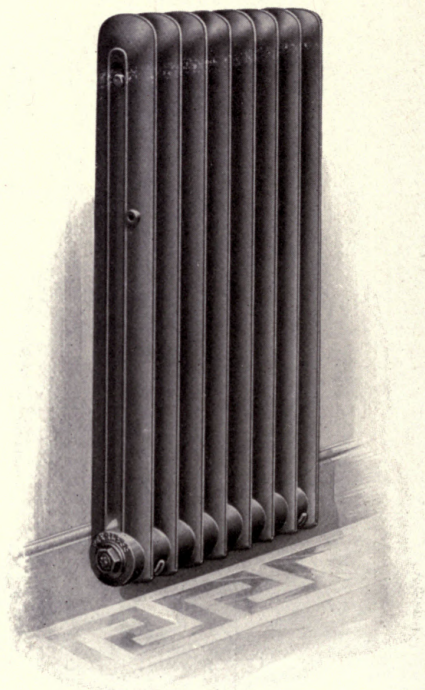
For distance from floor to center of tapping, and distances between centers of upper and lower tapings, etc., see page 104.

Connected at top and bottom with extra-heavy right and left threaded nipples for Water, and extra-heavy right-hand threaded nipples at bottom for Steam. For one-pipe Steam work the supply-leg section has low drip hub, and for two-pipe Steam work the return-leg section has low drip hub.

\* In estimating length of Radiator allow ½ inch for each bushing.

# Direct Radiators on Brackets

For Steam and Water



Peerless Single Column

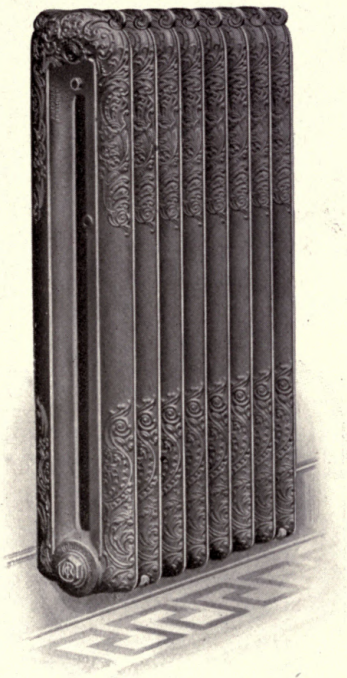
Illustration above is to show how Radiator may be supported by Concealed Brackets. For description of Brackets and their special uses, see page 101.

Rococo One-, Two-, and Three-Column and Peerless Single-Column Radiators can be fitted with these Brackets on special orders.

NOTE.—Orders which call for “Radiators without legs, to be used in connection with Brackets,” will be understood by plant to mean Radiators with the regular end leg, but with the feet cut off, and will have the regular outside tapping into which a bushing can be screwed and will have the regular air-vent.

# Direct Radiators on Brackets

For Steam and Water



**Rococo Two-Column**

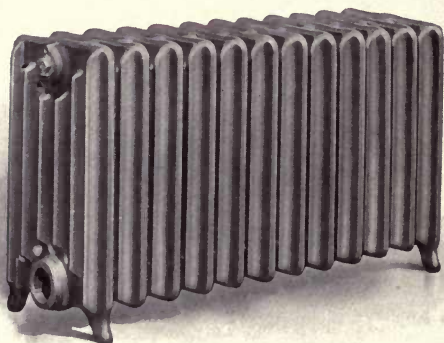
This type of Radiator is very desirable for use in narrow corridors, or in rooms where floor space is limited; specially advantageous for side walls, or in basements above water line of Steam Boilers. Can be used for heating aspirating shafts in ventilating work, etc.

The same data, as regards heating surface, threading nipple connection, and tapping, applies to these patterns as to Radiators having feet.



# Rococo Window Radiators

For Steam or Water



No. of Sections	* Length 3 Inches per Section	HEATING SURFACE—SQUARE FEET		
		20-in. Height 5 Sq. Ft. per Section	16-in. Height 3 $\frac{3}{4}$ Sq. Ft. per Section	13-in. Height 3 Sq. Ft. per Section
2	6	10	7 $\frac{1}{2}$	6
3	9	15	11 $\frac{1}{4}$	9
4	12	20	15	12
5	15	25	18 $\frac{3}{4}$	15
6	18	30	22 $\frac{1}{2}$	18
7	21	35	26 $\frac{1}{4}$	21
8	24	40	30	24
9	27	45	33 $\frac{3}{4}$	27
10	30	50	37 $\frac{1}{2}$	30

Can be built up like all AMERICAN Radiators to any practical greater number of sections. Tapped 2 inches, and bushed as per list on page 105.

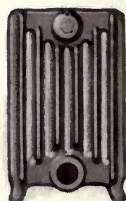
Eccentric bushings will be supplied if so required and specially ordered.

As made at Detroit Plant these Radiators are connected with extra-heavy right- and left-hand threaded nipples.

Top of each leg section has 1 $\frac{1}{2}$ -inch plug which can be taken out to make top connection when desired.

For data regarding width of sections, distance from floor to center of tapping, distances between centers of upper and lower tapings, etc., see page 104.

\*In estimating length of Radiators, allow  $\frac{1}{2}$  inch for each bushing.

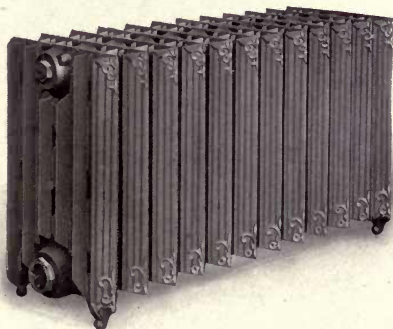


View of End Section



# Aetna Flue Window Radiators

For Steam or Water



No. of Sections	* Length, 3 inches per Sec.	HEATING SURFACE—SQUARE FEET				
		20-in. Height. 6 sq. ft. per Sec.	18-in. Height. 5 $\frac{1}{3}$ sq. ft. per Sec.	16-in. Height. 4 $\frac{2}{3}$ sq. ft. per Sec.	14-in. Height. 4 sq. ft. per Sec.	13-in. Height. 3 $\frac{2}{3}$ sq. ft. per Sec.
2	6	12	10 $\frac{2}{3}$	9 $\frac{1}{3}$	8	7 $\frac{1}{3}$
3	9	18	16	14	12	11
4	12	24	21 $\frac{1}{3}$	18 $\frac{2}{3}$	16	14 $\frac{2}{3}$
5	15	30	26 $\frac{2}{3}$	23 $\frac{1}{3}$	20	18 $\frac{1}{3}$
6	18	36	32	28	24	22
7	21	42	37 $\frac{1}{3}$	32 $\frac{2}{3}$	28	25 $\frac{2}{3}$
8	24	48	42 $\frac{2}{3}$	37 $\frac{1}{3}$	32	29 $\frac{1}{3}$
9	27	54	48	42	36	33
10	30	60	53 $\frac{1}{3}$	46 $\frac{2}{3}$	40	36 $\frac{2}{3}$
11	33	66	58 $\frac{2}{3}$	51 $\frac{1}{3}$	44	40 $\frac{1}{3}$
12	36	72	64	56	48	44

Can be built up, like all AMERICAN Radiators, to any practical greater number of sections.

For Aetna Curved and Corner Radiators, see pages 94 and 97.

Above Radiators are tapped 2 inches, and bushed as per list on page 105.

Each section is 12 $\frac{1}{2}$  inches wide.

For distance from floor to center of tapping, and distances between centers of upper and lower tapplings, etc., see page 104.

For one-pipe Steam work the supply-leg section is constructed with low drip hub, and for two-pipe Steam work the return-leg section is constructed with low drip hub.

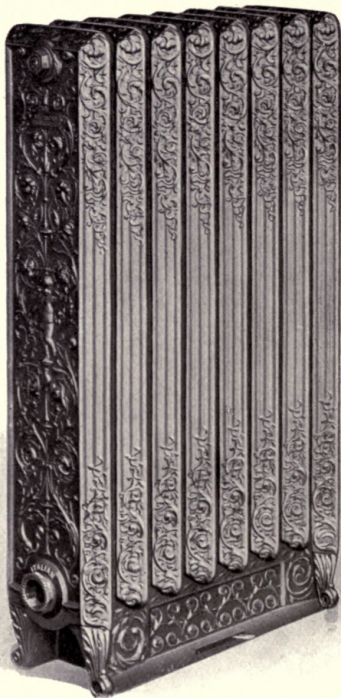
Connected with extra-heavy right- and left-hand threaded nipples.

Top of each leg section has 1 $\frac{1}{2}$ -inch plug, which can be taken out to make top connection when desired.

\* In estimating length of Radiator allow  $\frac{1}{2}$  inch for each bushing.

# Italian Orna. Flue Ventilating Radiators

For Steam and Water



Each section is  $8\frac{1}{2}$  inches wide.

This pattern of Radiator is not made in any special or odd shape, as the Box-Bases can only be made in straight form.

See page 84 for illustrations and data of the adjustable Box Bases.

*In ordering please state whether back or bottom inlet is required.*

# Italian Orna. Flue Ventilating Radiators

## For Steam and Water

No. of Sections	* Length 3 inches per Sec.	HEATING SURFACE—SQUARE FEET			
		39½-in. Height. 7 sq. ft. per Sec.	33½-in. Height. 5¾ sq. ft. per Sec.	27½-in. Height. 4½ sq. ft. per Sec.	21½-in. Height. 3¼ sq. ft. per Sec.
2	6	14	11 ½	9	6 ½
3	9	21	17 ¼	13 ½	9 ¾
4	12	28	23	18	13
5	15	35	28 ¾	22 ½	16 ¼
6	18	42	34 ½	27	19 ½
7	21	49	40 ¼	31 ½	22 ¾
8	24	56	46	36	26
9	27	63	51 ¾	40 ½	29 ¼
10	30	70	57 ½	45	32 ½
11	33	77	63 ¼	49 ½	35 ¾
12	36	84	69	54	39
13	39	91	74 ¾	58 ½	42 ¼
14	42	98	80 ½	63	45 ½
15	45	105	86 ¼	67 ½	48 ¾
16	48	112	92	72	52
17	51	119	97 ¾	76 ½	55 ¼
18	54	126	103 ½	81	58 ½
19	57	133	109 ¼	85 ½	61 ¾
20	60	140	115	90	65
21	63	147	120 ¾	94 ½	68 ¼
22	66	154	126 ½	99	71 ½
23	69	161	132 ¼	103 ½	74 ¾
24	72	168	138	108	78
25	75	175	143 ¾	112 ½	81 ¼

Above Radiators are tapped 2 inches, and bushed as per list on page 105.

For distance from floor to center of tapping, and distances between centers of upper and lower tapplings, etc., see page 104.

Connected with extra-heavy right- and left-hand threaded nipples.

For one-pipe Steam work the supply-leg section is constructed with low drip hub, and for two-pipe Steam work the return-leg section is constructed with low drip hub.

\* In estimating length of Radiator allow ½ inch for each bushing.

# Italian Flue Box-Bases



Showing Rear Half of Box-Base and Dampers.  
Each Air-Inlet Closed.

*(Patent applied for)*

Outside measurements of flange or lip around back air-inlet of Box-Base, for attaching sheet-iron sleeve or pipe, are:—

No.	Base Section	Inches	No.	Base Section	Inches
G-53	3	2¼ x 3¼	G-58	8	14¼ x 3¼
G-54	4	5½ x 3¼	G-59	9	15¼ x 3¼
G-55	5	6 x 3¼	G-60	10	18¼ x 3¼
G-56	6	9 x 3¼	G-61	11	21¼ x 3¼
G-57	7	11½ x 3¼	G-62	12	24¼ x 3¼



Box-Base, showing Operation of Dampers.  
For Bottom Air-Inlet.

*(Patent applied for)*

Where air conduit is brought up through floor, under radiator, the opening in floor to be covered by dampers in Base should be:—

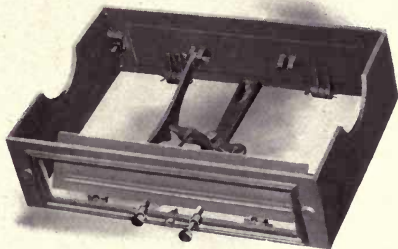
No.	Base Section	Inches	No.	Base Section	Inches
H-53	3	3¼ x 3½	H-58	8	14¾ x 3¾
H-54	4	5½ x 3½	H-59	9	15¾ x 3¾
H-55	5	6½ x 3½	H-60	10	18 x 3¾
H-56	6	8½ x 3¾	H-61	11	21½ x 3¾
H-57		11½ x 3¾	H-62	12	24½ x 3¾

NOTE.—12-Section Box-Base is to be used for Radiator of twelve sections, or any even number of sections larger. 11-Section Box-Base for Radiator of eleven sections, or any odd number of sections larger. Bottom of back air-inlet opening is 1 inch above floor level. In ordering Box-Bases to be placed in middle of long Radiators, note that, for instance, to cover six flues or middle sections requires an 8-Section Base, to cover seven flues or middle sections requires 9-Section Base, etc.

# New Adjustable Box Base

## For Ventilating Radiators

This portable interchangeable Base is compact and fits under the Radiator snugly; the dampers work with reversible action, so that when the inside inlet is open the outside damper in the front of the Base is closed and vice versa. Can be

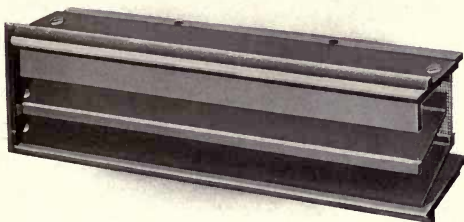


Front View—with Rear Wall Collar and Damper furnished with either an opening and damper in the back (as shown) or in the floor, as may be desired.

Made at Detroit Plant only. Orders should always stipulate whether the bases are desired with regular inlet collar in the rear as above shown, or for inlet to come through the floor.

See list of sizes on page 87.

## Wall Boxes



These are substantially constructed; and their angle slats and inside brass-wire screen render them storm- and insect-proof. Outside measurement of Wall Box is  $5 \times 17\frac{1}{2}$  inches, to conform with brick measure. The outside measurement of the flange is  $4\frac{3}{4} \times 17$  inches.

Brass and Bronze Wall Boxes: Made, the same dimensions as Iron Wall Boxes, entirely of commercial brass or bronze, including the deflecting plates and wire screen. Shipped in the rough unless otherwise ordered. Made at Detroit Plant.



# New Adjustable Box-Bases

For Ventilating Radiators



Front View:—Above Base is a No. G-8-3, for a Rococo 3-Column 8-section Radiator.

These bases and corresponding front and back plates are regularly made in eleven sizes for Rococo One-, Two-, Three- and Four-Column; Peerless One-, Two-, Three- and Four-Column, as listed on page 87. They fit under regular AMERICAN Radiators as carried in our warehouses, with reference to the amount of air required, rather than the size of the Radiator. The smallest size Three-Column Base (No. G-5-3) fits under a five-section Radiator, or larger (in odd sections.) The largest size (No. G-15-3) fits under a fifteen-section Radiator, or larger (in odd sections.) A detailed view of the Base appears on page 85, and sizes of openings on page 87.

The two plates which are adjusted to the front and back of the Radiator, on top of the Base, are held in place by bolts running through the center or corners of the plate, which can readily be removed for cleaning.

# New Adjustable Box-Bases

NOTE.—Measurements are given in inches for Bases with back opening, and for bottom openings. The data on back opening Base represents outside measure of the iron flanges; the data on bottom opening Base represents the largest size openings which can be cut in the floor under the Bases for the air inlet.

Single-Column Box-Bases						Two-Column Box-Bases					
BACK OP'G			BOTTOM OP'G			BACK OP'G			BOTTOM OP'G		
No.	Width	Length	No.	Width	Length	No.	Width	Length	No.	Width	Length
G- 5-1	21 $\frac{3}{8}$	53 $\frac{1}{2}$	H- 5-1	3	5	G- 5-2	21 $\frac{3}{8}$	51 $\frac{9}{16}$	H- 5-2	3 $\frac{1}{2}$	5
G- 6-1	21 $\frac{3}{8}$	73 $\frac{5}{8}$	H- 6-1	3	7 $\frac{1}{2}$	G- 6-2	21 $\frac{3}{8}$	71 $\frac{9}{16}$	H- 6-2	3 $\frac{1}{2}$	7 $\frac{1}{2}$
G- 7-1	21 $\frac{3}{8}$	103 $\frac{3}{4}$	H- 7-1	3	10	G- 7-2	21 $\frac{3}{8}$	103 $\frac{3}{4}$	H- 7-2	3 $\frac{1}{2}$	10
G- 8-1	21 $\frac{3}{8}$	123 $\frac{5}{8}$	H- 8-1	3	12 $\frac{1}{2}$	G- 8-2	21 $\frac{3}{8}$	123 $\frac{5}{8}$	H- 8-2	3 $\frac{1}{2}$	12 $\frac{1}{2}$
G- 9-1	21 $\frac{3}{8}$	153 $\frac{1}{2}$	H- 9-1	3	15	G- 9-2	21 $\frac{3}{8}$	153 $\frac{1}{2}$	H- 9-2	3 $\frac{1}{2}$	15
G-10-1	21 $\frac{3}{8}$	173 $\frac{1}{2}$	H-10-1	3	17 $\frac{1}{2}$	G-10-2	21 $\frac{3}{8}$	173 $\frac{1}{2}$	H-10-2	3 $\frac{1}{2}$	17 $\frac{1}{2}$
G-11-1	21 $\frac{3}{8}$	203 $\frac{5}{8}$	H-11-1	3	20	G-11-2	21 $\frac{3}{8}$	203 $\frac{5}{8}$	H-11-2	3 $\frac{1}{2}$	20
G-12-1	21 $\frac{3}{8}$	223 $\frac{9}{16}$	H-12-1	3	22 $\frac{1}{2}$	G-12-2	21 $\frac{3}{8}$	223 $\frac{9}{16}$	H-12-2	3 $\frac{1}{2}$	22 $\frac{1}{2}$
G-13-1	21 $\frac{3}{8}$	253 $\frac{5}{8}$	H-13-1	3	25	G-13-2	21 $\frac{3}{8}$	253 $\frac{5}{8}$	H-13-2	3 $\frac{1}{2}$	25
G-14-1	21 $\frac{3}{8}$	273 $\frac{9}{16}$	H-14-1	3	27 $\frac{1}{2}$	G-14-2	21 $\frac{3}{8}$	273 $\frac{9}{16}$	H-14-2	3 $\frac{1}{2}$	27 $\frac{1}{2}$
G-15-1	21 $\frac{3}{8}$	301 $\frac{1}{8}$	H-15-1	3	30	G-15-2	21 $\frac{3}{8}$	301 $\frac{1}{8}$	H-15-2	3 $\frac{1}{2}$	30

Three-Column Box-Bases						Four-Column Box-Bases					
BACK OP'G			BOTTOM OP'G			BACK OP'G			BOTTOM OP'G		
No.	Width	Length	No.	Width	Length	No.	Width	Length	No.	Width	Length
G- 5-3	21 $\frac{3}{8}$	51 $\frac{9}{16}$	H- 5-3	3 $\frac{1}{2}$	5	G- 5-4	23 $\frac{1}{8}$	63 $\frac{3}{8}$	H- 5-4	4	6 $\frac{1}{2}$
G- 6-3	21 $\frac{3}{8}$	71 $\frac{9}{16}$	H- 6-3	3 $\frac{1}{2}$	7 $\frac{1}{2}$	G- 6-4	23 $\frac{1}{8}$	93 $\frac{1}{2}$	H- 6-4	4	9 $\frac{1}{2}$
G- 7-3	21 $\frac{3}{8}$	103 $\frac{3}{4}$	H- 7-3	3 $\frac{1}{2}$	10	G- 7-4	23 $\frac{1}{8}$	123 $\frac{5}{8}$	H- 7-4	4	12 $\frac{1}{2}$
G- 8-3	21 $\frac{3}{8}$	123 $\frac{5}{8}$	H- 8-3	3 $\frac{1}{2}$	12 $\frac{1}{2}$	G- 8-4	23 $\frac{1}{8}$	153 $\frac{1}{2}$	H- 8-4	4	15 $\frac{1}{2}$
G- 9-3	21 $\frac{3}{8}$	153 $\frac{1}{2}$	H- 9-3	3 $\frac{1}{2}$	15	G- 9-4	23 $\frac{1}{8}$	183 $\frac{3}{4}$	H- 9-4	4	18 $\frac{1}{2}$
G-10-3	21 $\frac{3}{8}$	173 $\frac{1}{2}$	H-10-3	3 $\frac{1}{2}$	17 $\frac{1}{2}$	G-10-4	23 $\frac{1}{8}$	213 $\frac{9}{16}$	H-10-4	4	21 $\frac{1}{2}$
G-11-3	21 $\frac{3}{8}$	203 $\frac{5}{8}$	H-11-3	3 $\frac{1}{2}$	20	G-11-4	23 $\frac{1}{8}$	24 $\frac{9}{16}$	H-11-4	4	24 $\frac{1}{2}$
G-12-3	21 $\frac{3}{8}$	223 $\frac{9}{16}$	H-12-3	3 $\frac{1}{2}$	22 $\frac{1}{2}$	G-12-4	23 $\frac{1}{8}$	27 $\frac{1}{8}$	H-12-4	4	27 $\frac{1}{2}$
G-13-3	21 $\frac{3}{8}$	253 $\frac{5}{8}$	H-13-3	3 $\frac{1}{2}$	25	G-13-4	23 $\frac{1}{8}$	30 $\frac{9}{16}$	H-13-4	4	30 $\frac{1}{2}$
G-14-3	21 $\frac{3}{8}$	273 $\frac{9}{16}$	H-14-3	3 $\frac{1}{2}$	27 $\frac{1}{2}$	G-14-4	23 $\frac{1}{8}$	33 $\frac{1}{8}$	H-14-4	4	33 $\frac{1}{2}$
G-15-3	21 $\frac{3}{8}$	301 $\frac{1}{8}$	H-15-3	3 $\frac{1}{2}$	30	G-15-4	23 $\frac{1}{8}$	36 $\frac{9}{16}$	H-15-4	4	36 $\frac{1}{2}$

Orders should state whether "Back Opening" or "Bottom Opening."

# Areal Sanitary Ventilating Radiators

For Steam Only



	No. 10	No. 15
Total Height of Radiator and Base	30 $\frac{1}{8}$ inches	30 $\frac{1}{8}$ inches
Length over all " " "	*29 $\frac{1}{4}$ inches	*44 $\frac{1}{4}$ inches
Width of Panel.....	12 $\frac{1}{2}$ inches	12 $\frac{1}{2}$ inches
Width of Base at floor line.....	12 inches	12 inches
Heating Surface.....	80 sq. ft.	120 sq. ft.
Depth of Lip on back of Base.....	1 $\frac{1}{4}$ inches	1 $\frac{1}{4}$ inches
Length of Lip, outside measurement	24 inches	40 $\frac{1}{2}$ inches
Width of Lip, outside measurement	6 $\frac{3}{8}$ inches	6 $\frac{3}{8}$ inches
Number of square inches in Air opening—i. e., inside measurement of Back opening.....	23 $\frac{1}{2}$ x6 inches	40x6 inches

Above Radiators are tapped 2 inches and bushed, as per list on page 105.

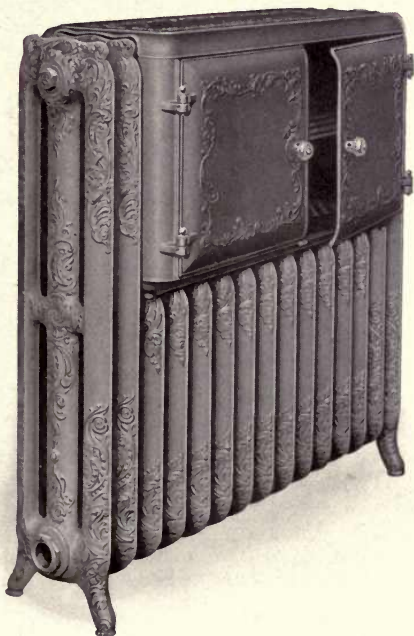
Distance from floor to center of supply tapping is 9 inches, return 8 $\frac{1}{2}$  inches.

For one-pipe Steam work the supply-leg section is constructed with low drip hub, and for two-pipe Steam work the return-leg section is constructed with low drip hub.

\* In estimating length of Radiator allow  $\frac{1}{2}$  inch for each bushing.

# Hot-Closet Radiators

Made in 44-Inch Rococo Only, Steam and Water



Number	*L'gth inches	Heating Surface square feet	Number	*L'gth inches	Heating Surface square feet
2	37 ½	53	6	57 ½	93
3	42 ½	63	7	62 ½	103
4	47 ½	73	8	67 ½	113
5	52 ½	83	Made larger on special order		

These Radiators are tapped 2 inches and bushed as per list on page 105. Oven has two shelves 26½ inches long, 12½ inches wide, with 7 inches space between. Doors are stenciled “R” for Right; “L” for Left—for correct assembling.

The outside width of oven is 14 inches, and this fact should be borne in mind by fitters when arranging for connections, so that distance from center of tapping to wall shall not be less than 9 inches.

\*In estimating *length*, allow ½ inch for each bushing.

# Rococo Pantry Radiators

For Steam or Water



This Radiator and Plate-warmer combined is made up from Rococo Wall Sections (7-foot only)—for Steam or Water.

It is not only very handy for residence pantries, but in extended constructions this warmer will be found most adaptable to the needs of hotel and restaurant kitchens wherein it is necessary to keep a large number of plates and other dishes warm and ready for service. It can be made up in various heights. It is shipped made up.

## Measurements

No.	Heights Inches	Heating Surface	List Price
1	7	7 sq. ft.	\$ 8.00
2	17	15 "	15.00
3	27	23 "	22.00
4	37	31 "	29.00
5	47	39 "	36.00

Length..... 23 inches  
 Width..... 13¼ "  
 Height, floor to bottom of lower section..... 4 "

In ordering, state whether for Steam or Water, and what size tapping is required.



# Circular Radiators

## Notes on Construction

Circular Radiators are made in heights as listed on pages 57, 59, 61, 65, 67, and 69.

Tapped 2 inches and bushed as per list on page 105.

Circular Radiators are furnished in two pieces, forming two separate and distinct Radiators, which are simply bolted together, and can be taken apart, placed around a column and again bolted together. For one-pipe work this Radiator has two tappings for valves; for two-pipe work and for Water it has four tappings for valves—two supply in front and two return in back.

When above Circular Radiators (for Steam only) are not intended to be placed around a column or post, they can, when specially ordered, be furnished all in one piece, having two connections for valves for two-pipe work. One-piece Circular Radiators are not supplied for one-pipe Steam, as the drainage would be unsatisfactory. Where Circular Radiators are used in connection with one-pipe system, each half of the circle should be connected as an independent Radiator. All Circular Water Radiators are made in two pieces.

In order to give more space for adjusting valves the sections of all Circular Steam and Water Radiators having supply and return openings are separated by an intermediate section without tapping boss, as shown in illustration.

Radiators above listed are all made at Pierce and Detroit Plants, except the twelve section, which is made at Detroit Plant only.

The following Circular Radiators, in the Rococo 38-inch Two-Column Steam pattern **only**, are regularly carried in stock:—

No.	Sections	Heating Surface Square Feet	List Price
1	12	48	\$33.00
2	16	64	44.00
3	20	80	55.00
4	24	96	66.00
5	28	112	77.00
6	32	128	88.00
7	36	144	99.00

All other patterns made on special order only.

Distance from floor to center of either supply or return tapping is 4 inches.

Circular Radiators can be made to work as one Radiator, single-pipe system, by use of elbows and tee.

## Circular Radiators



Rococo Two-Column Circular Radiator

Made in all heights of following patterns: -

Peerless Single-Column (steam and water).

Peerless Two-Column (steam and water).

Peerless Three-Column (steam and water).

Rococo One-Column (steam and water).

Rococo Two-Column (steam and water).

Rococo Three-Column (steam and water).

For measurements, see page 93.

Rococo Two-Column Circular Steam Radiators, in 38-inch height only, are carried in stock at Detroit Plant, as per list on page 91.

All other patterns of Circular Radiators made on special order only.

# Circular Radiators—Continued

## Rococo and Peerless Single-Column—Steam and Water

No. of Sections	Outside Diameter at Legs	Inside Diameter at Legs	No. of Sections	Outside Diameter at Legs	Inside Diameter at Legs
16	20 $\frac{3}{4}$	8 $\frac{3}{4}$	40	38	26
18	22 $\frac{1}{4}$	10 $\frac{1}{4}$	42	39 $\frac{1}{2}$	27 $\frac{1}{2}$
20	23 $\frac{5}{8}$	11 $\frac{5}{8}$	44	40 $\frac{7}{8}$	28 $\frac{7}{8}$
22	25 $\frac{1}{8}$	13 $\frac{1}{8}$	46	42 $\frac{3}{8}$	30 $\frac{3}{8}$
24	26 $\frac{1}{2}$	14 $\frac{1}{2}$	48	43 $\frac{3}{4}$	31 $\frac{3}{4}$
26	28	16	50	45 $\frac{1}{4}$	33 $\frac{1}{4}$
28	29 $\frac{3}{8}$	17 $\frac{3}{8}$	52	46 $\frac{5}{8}$	34 $\frac{5}{8}$
30	30 $\frac{7}{8}$	18 $\frac{7}{8}$	54	48 $\frac{1}{8}$	36 $\frac{1}{8}$
32	32 $\frac{1}{4}$	20 $\frac{1}{4}$	56	49 $\frac{1}{2}$	37 $\frac{1}{2}$
34	33 $\frac{3}{4}$	21 $\frac{3}{4}$	58	51	39
36	35 $\frac{1}{8}$	23 $\frac{1}{8}$	60	52 $\frac{3}{8}$	40 $\frac{3}{8}$
38	36 $\frac{5}{8}$	24 $\frac{5}{8}$			

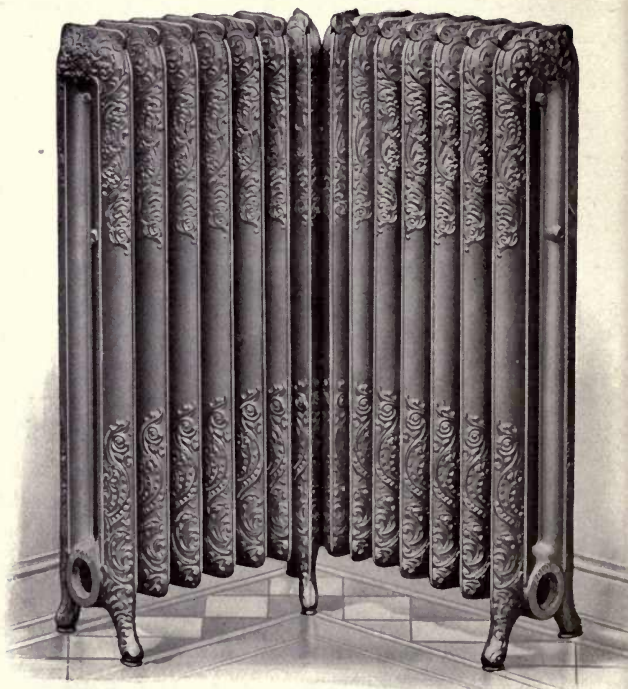
## Rococo and Peerless Two-Column—Steam and Water

12	20 $\frac{7}{8}$	2 $\frac{7}{8}$	38	39 $\frac{5}{8}$	21 $\frac{5}{8}$
16	23 $\frac{3}{4}$	5 $\frac{3}{4}$	40	41	23
18	25 $\frac{1}{4}$	7 $\frac{1}{4}$	42	42 $\frac{1}{2}$	24 $\frac{1}{2}$
20	26 $\frac{5}{8}$	8 $\frac{5}{8}$	44	43 $\frac{7}{8}$	25 $\frac{7}{8}$
22	28 $\frac{1}{8}$	10 $\frac{1}{8}$	46	45 $\frac{3}{8}$	27 $\frac{3}{8}$
24	29 $\frac{1}{2}$	11 $\frac{1}{2}$	48	46 $\frac{3}{4}$	28 $\frac{3}{4}$
26	31	13	50	48 $\frac{1}{4}$	30 $\frac{1}{4}$
28	32 $\frac{3}{8}$	14 $\frac{3}{8}$	52	49 $\frac{5}{8}$	31 $\frac{5}{8}$
30	33 $\frac{7}{8}$	15 $\frac{7}{8}$	54	51 $\frac{1}{8}$	33 $\frac{1}{8}$
32	35 $\frac{1}{4}$	17 $\frac{1}{4}$	56	52 $\frac{1}{2}$	34 $\frac{1}{2}$
34	36 $\frac{3}{4}$	18 $\frac{3}{4}$	58	54	36
36	38 $\frac{1}{8}$	20 $\frac{1}{8}$	60	55 $\frac{3}{8}$	37 $\frac{3}{8}$

## Rococo and Peerless Three-Column—Steam and Water

12	24	3	38	41 $\frac{1}{8}$	20 $\frac{1}{8}$
14	25 $\frac{1}{4}$	4 $\frac{1}{4}$	40	42 $\frac{1}{2}$	21 $\frac{1}{2}$
16	26 $\frac{5}{8}$	5 $\frac{5}{8}$	42	43 $\frac{3}{4}$	22 $\frac{3}{4}$
18	28	7	44	45	24
20	29 $\frac{1}{4}$	8 $\frac{1}{4}$	46	46 $\frac{3}{8}$	25 $\frac{3}{8}$
22	30 $\frac{1}{2}$	9 $\frac{1}{2}$	48	47 $\frac{3}{4}$	26 $\frac{3}{4}$
24	31 $\frac{7}{8}$	10 $\frac{7}{8}$	50	49	28
26	33 $\frac{1}{4}$	12 $\frac{1}{4}$	52	50 $\frac{3}{8}$	29 $\frac{3}{8}$
28	34 $\frac{1}{2}$	13 $\frac{1}{2}$	54	51 $\frac{3}{4}$	30 $\frac{3}{4}$
30	35 $\frac{7}{8}$	14 $\frac{7}{8}$	56	53	32
32	37 $\frac{1}{4}$	16 $\frac{1}{4}$	58	54 $\frac{1}{4}$	33 $\frac{1}{4}$
34	38 $\frac{1}{2}$	17 $\frac{1}{2}$	60	55 $\frac{5}{8}$	34 $\frac{5}{8}$
36	39 $\frac{3}{4}$	18 $\frac{3}{4}$			

## Corner Radiators



### Rococo Two-Column

Corner Radiators are made in all heights of the following patterns:-  
Aetna Window (Detroit Plant).

Rococo Window (Detroit Plant).

Italian Flue, Steam and Water (Detroit Plant).

Peerless Single-Column, Steam only (Pierce Plant).

Peerless Two-Column, Steam and Water (Detroit Plant).

Peerless Two-Column, Steam only (Pierce Plant).

Peerless Three-Column, Steam and Water (Detroit Plant).

Peerless Three-Column, Steam only (Pierce Plant).

Rococo Single-Column, Steam only (Pierce Plant).

Rococo Two-Column, Steam only (Pierce Plant).

Rococo Two-Column, Steam and Water (Detroit Plant).

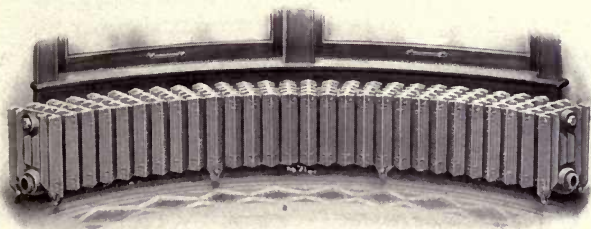
Rococo Three-Column, Steam and Water (Detroit Plant).

Rococo Three-Column, Steam only (Pierce Plant).

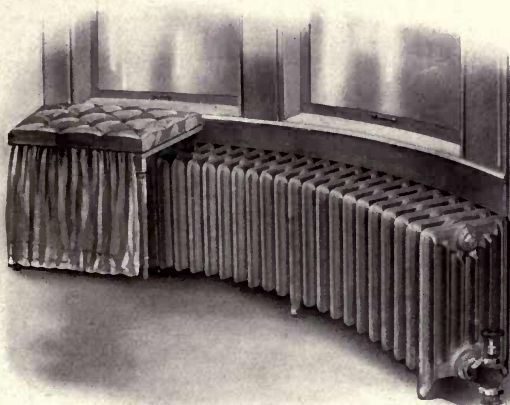
Verona, Steam and Water (Detroit Plant).

NOTE.—For Steam indicate which end has supply tapping.

# Curved Radiators



**Aetna Flue Curved Radiator**



**Rococo Curved Window Radiator**

Curved Radiators are made in all heights of patterns as follows:—

Peerless Single-Col. (Steam and Water).	Verona (Steam and Water).
Peerless Two-Col. (Steam and Water).	Rococo Window.
Rococo Single-Col. (Steam and Water).	Aetna Flue.
Rococo Two-Col. (Steam and Water).	Italian Flue.
Rococo Three-Col. (Steam and Water).	

**NOTE.**—In ordering Curved or Corner Radiators, specify the exact radius or angle of the base-board within which the Radiator is to be placed. For method of arriving at exact radius or angle, see drawings and instructions on pages 183 to 185.

**NOTE.**—Where Radiators are covered by seats, curtains, shields, etc., this fact is to be taken into account in estimating quantity of radiation required for proper service.

*It is important that a heavy paper template showing exact size and radius of each curved radiator shall accompany the order.*



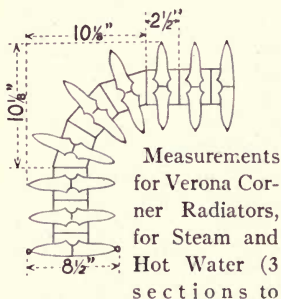
# Corner Radiator Measurements

In ordering Corner Radiators give number of sections in corner and number of sections in each arm, also state which arm, looking into corner, has the supply leg.

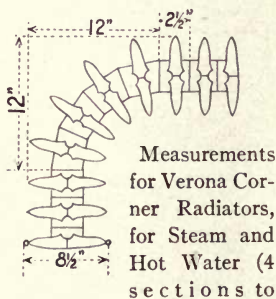
For ordering Corner or Curved Radiators, see page 183.

In all heights of Curved and Corner Steam Radiators, owing to the difference in heights of supply and return end tappings from floor, we must know (by sketch) which end of Radiator is for supply and which for return, as you face the inside of angle or curve.

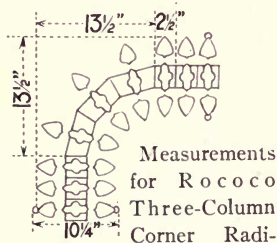
In estimating length of Radiators allow  $\frac{1}{2}$  inch for each bushing.



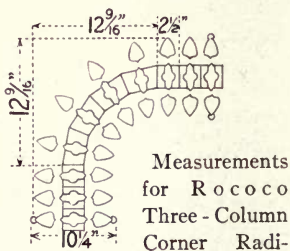
Measurements for Verona Corner Radiators, for Steam and Hot Water (3 sections to make corner). For heights and heating surfaces of sections, see page 73.



Measurements for Verona Corner Radiators, for Steam and Hot Water (4 sections to make corner.) For heights and heating surfaces of sections, see page 73.

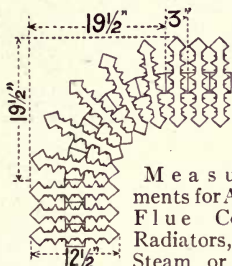


Measurements for Rocco Three-Column Corner Radiators, for Steam and Water (3 sections to make corner). For heights and heating surfaces of sections, see page 61.

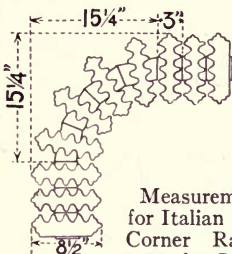


Measurements for Rocco Three-Column Corner Radiators, for Steam and Water (4 sections to make corner.) For heights and heating surfaces of sections, see page 61.

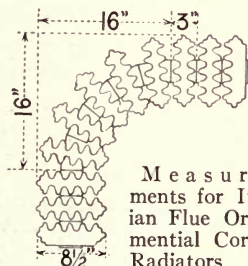
# Corner Radiator Measurements—Continued



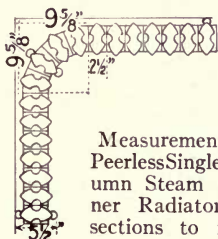
Measurements for Aetna Flue Corner Radiators, for Steam or Hot Water (5 sections to make corner). For heights and heating surfaces of sections, see page 81.



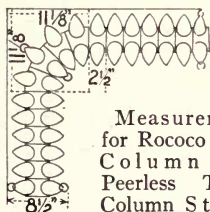
Measurements for Italian Flue Corner Radiators, for Steam and Hot Water (4 sections to make corner). For heights and heating surfaces of sections, see page 81.



Measurements for Italian Flue Ornamental Corner Radiators, for Steam and Hot Water (5 sections to make corner). For heights and heating surfaces of sections, see page 75.



Measurements for Peerless Single-Column Steam Corner Radiators (4 sections to make corner). For heights and heating surfaces of sections, see page 65.



Measurements for Rococo Two-Column and Peerless Two-Column Steam Corner Radiators (4 sections to make corner). For heights and heating surfaces of sections, see pages 59 and 67.

NOTE.—Particular attention is directed to the "Instructions in Geometrical Drawing" on pages 183 to 185. A careful reading will aid those who are not accustomed to plotting curves and angles to lay out a template showing exact size and radius for Curved and Corner Radiators, thus facilitating the prompt shipment of orders.

## Detachable High Legs

*(Patent applied for)*

As shown on this page are made, upon special order, for all heights of Italian Flue (without Box-Bases), Verona, Rococo Two- and Three-Column, Peerless Two- and Three-Column, and Aetna Flue Radiators.



These legs can be furnished so that the distance from floor to center of tapping will be as follows:—

- Supply and Return, Water, 6" or 8"
- Supply, Two-Pipe Steam, 6" or 8"
- Return, Two-Pipe Steam, 5½" or 7½"
- Supply, One-Pipe Steam, 5½" or 7½"

For Rococo Window Radiators these legs are furnished in one height only; 7½ inches from floor to center of supply tapping.

If any other distances from floor to center of tapping are absolutely required they can be furnished on special order only.

These legs are detached and shipped separately, thus removing possibility of breakage.

The size of each pair of Detachable Legs is cut on the inside of each half, as "5½ x 6." These numbers show the distance which the legs will bring the center of the tapping from floor. For example, the 5½- x 6-inch legs bring both

Detachable High Legs tappings of a Water Radiator 6 inches from floor; in a double-pipe steam job, the supply would be 6 inches and the return 5½ inches from the floor; in a single-pipe steam job the supply or low drip end would be 5½ inches from the floor.

In ordering Radiators having Detachable Legs, always give distance from floor to center of what is to be the supply tapping of Radiator; and when for Steam Radiators, be sure to state whether for one- or two-pipe jobs.

## Extra-High Solid Legs

Extra-High Solid Legs, as shown by illustration on this page, can be furnished on special order only, in all heights, except 45-inch sections, of

Peerless . . . . .	One-Column
Peerless . . . . .	Two-Column
Peerless . . . . .	Three-Column
Peerless . . . . .	Four-Column
Rococo . . . . .	One-Column
Rococo . . . . .	Two-Column
Rococo . . . . .	Three-Column

so that distance from floor to center of tapping will be 6 or 8 inches, as ordered. If high solid legs are required for Rococo Four-Column, all heights, or 45-inch heights of all other patterns, inquire what heights can be furnished.

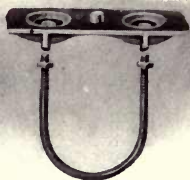
Other distances, if absolutely required furnished on special order only.

These Radiators with Extra-High Solid Legs are tapped 2 inches and bushed according to list on page 105.

NOTE.—In ordering Radiators having Extra-High Solid Legs, always give distance required from floor to the center of what is to be the supply tapping of Radiator; and when for Steam, be sure to state whether for one- or two-pipe work.



## Saddles for Marble Tops



Saddle for Steam Radiator

Saddle for Hot-Water Radiator

These Saddles fit Peerless and Rococo One-, Two-, Three-, and Four-Column Radiators.

They afford a rest or support upon which marble tops can be placed. Two of these saddles are usually sufficient for a Radiator, but in the case of a Radiator of 15 sections or more it is advisable to use three saddles—one in the center and one at either end.

## Lugs for Marble Tops

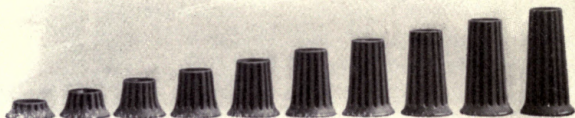
The following patterns are, when so specially ordered, arranged with lugs on top of leg sections for holding marble-tops:—



Italian Flue Verona Rococo (Detroit)

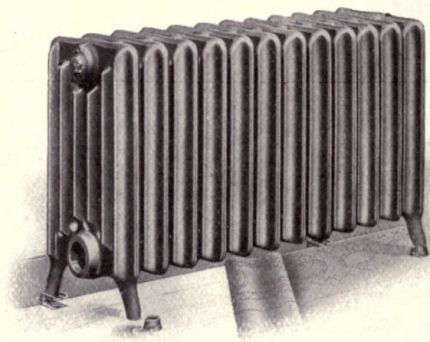
Removable lugs, as illustrated, are manufactured at Detroit Plant to fit: Rococo Two- and Three-Column, Rococo Window, and Aetna Window Radiators.

## Radiator Pedestals



Pedestals to fit under legs of all styles and heights of any of our Direct Radiators can be furnished in the following heights:  $\frac{1}{2}$ , 1,  $1\frac{1}{2}$ , 2,  $2\frac{1}{2}$ , 3,  $3\frac{1}{2}$ , 4,  $4\frac{1}{2}$ , and 5 inches. Made at Pierce Plant.

## Radiator Foot-Ups



View of a new Radiator "Foot-up," showing its application to a low Radiator, and illustrating the method of taking up a carpet without changing anything but one of the Foot-ups at a time. The advantages of these little conveniences are as follows:—Very neat in appearance; easily adjusted; save time and money; do away with radiator boards; save cutting carpet or displacing the radiator to take up the carpet. These Foot-ups set the Radiator up from floor  $1\frac{1}{8}$  inches. List prices: Two pieces to a set; plain, 25 cents per set; nickeled, 40 cents per set. Made at Pierce Plant.



# Radiator Wrenches



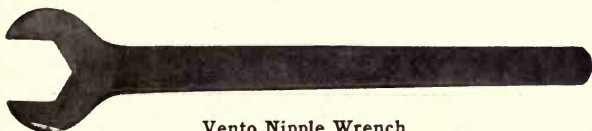
## Direct Radiator Wrench

On the inside of each right and left-hand threaded nipple are cast two heavy projecting lugs, so that an ordinary piece of bar-iron flattened at one end, the length of nipple, can be inserted to any desired point in the Radiator, and by applying wrench to bar the nipple can be unscrewed and one or more sections may be taken out independent of all the others in the stack. Made in two sizes, for  $1\frac{1}{2}$ -inch and 2-inch nipples. We do not supply the double-ended wrench for 60 degree nipples.



## Indirect Radiator Wrench

These drop-forged steel wrenches are made especially for assembling Indirect Radiators connected with right- and left-hand threaded nipple having hexagon nut at center. Made in two sizes, for  $1\frac{1}{2}$ - and 2-inch nipple openings. Carried in stock at Steele and Standard Plants.



## Vento Nipple Wrench

For Vento Sections this wrench will be found most practical. Made of drop-forged steel, for right- and left-hand threaded nipples having a hexagon nut at the center. It has a 3-inch opening to engage the nut of a  $2\frac{1}{2}$ -inch nipple and is strong and durable. Carried in stock at Steele Plant.

# Concealed Brackets

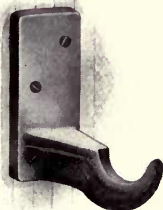
For supporting Single-Column, Two-Column, Three-Column, and Four-Column Direct Radiators of patterns made by us. Distance from wall to center of tapping in Radiator is—in the Single-Column,  $3\frac{1}{4}$  inches; Two - Column, 5 inches; Three-Column,  $5\frac{3}{4}$  inches; Four-Column,  $6\frac{1}{2}$  inches.

A set consists of one each, top and bottom support. Ordinarily two sets will support a medium size of Radiator. Concealed Brackets are also made for Rococo Two - Column and Rococo Three-Column Direct Radiators, both Steam and Water, made at Detroit Plant. Same dimensions as above.

Steam Top Bracket at Detroit Plant made for right and left nipple construction. Steam Top Bracket at Pierce Plant made for right-hand nipple construction.



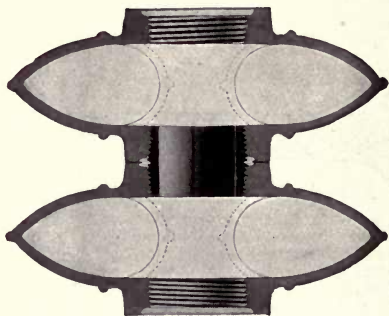
Top-Guide



Bottom Support

## Instructions for Assembling American Radiators

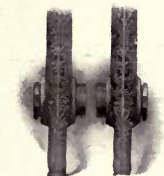
1. Wipe the nipple clean and inspect it carefully, to be sure that it has no defects which would affect the making of a tight joint.
2. Wipe the opening in the Radiator loop clean, to remove iron chips or dirt from the threads.
3. Paint the opening in the loop with Frazer's Pipe Joint Paste, or with a mixture made up of one-half red lead and one-half white lead, thinned with boiled linseed oil to the consistency of liquid paint.



Nipple in Its Place

4. In putting Right- and Left-Screw Nipple into Water Radiators see that the top and bottom Nipples start at the same time, and also that they enter both loops evenly so that one-half of each Nipple will be in each loop when assembled. The two Nipples should make up evenly. An asbestos gasket, provided for this purpose, should always be used.
5. In assembling Right and Left hexagon Nipples, start the right-hand thread (on the long side of the Nipple) one turn before engaging the left-hand thread.

# American Radiator Bushing System



**Hot Water**

Distance from floor to center of either supply or return tapping is  $4\frac{1}{2}$  inches. (See note.)

It is often necessary to change the tappings of Direct Radiators after they are ordered and received at the building. Sometimes a Direct Radiator is changed from one room to another in which the piping connection or valve may be larger or smaller; or a room may be altered in size and more sections added to the Radiator or some taken off, which will require changing the size of the supply pipe to conform to the new heating requirements. Therefore, to facilitate any changes which may develop, all AMERICAN Direct Radiators (except as stated in note) are tapped 2 inches and bushed as specified on page 105.

This system makes it easy to make alterations at any time without the re-tapping and re-threading of the end sections that would be necessary in radiation having solid tappings.

Few fitters are equipped to re-tap and re-thread a section on the job. It usually goes to the machine shop or a new one is ordered. Our system saves this expense and loss of time, always providing a basis for variable, yet reliable piping connections. The highly perfected machinery employed for tapping and for making our bushings, which is owned exclusively by this Company, insures a uniformity in tight joints.

For Steam Radiators double tappings can be changed to single tapping by the use of a plug in the supply end of the Radiator. On the other hand, Steam Radiators connected up to single-pipe work can be changed to double piping by replacing the plug on the return end with a bushing. Both supply and return legs have air-valve tappings with interchangeable plugs.

In ordering legs or end sections, specify if for supply or return and whether for single or double-pipe work.



**Single-Pipe Steam**

Distance from floor to center of tapping is 4 inches. (See note.)



**Double-Pipe Steam**

Distance from floor to center of supply tapping is  $4\frac{1}{2}$  inches; return 4 inches. (See note.)

## Exception

**NOTE.**—This system does not apply to Areal and Rococo Window.

# Special Data on American Direct Radiators

## Measurements of Sections and Tappings

STYLE	Dimensions of Sections			Distance in inches from floor to center of tapping for:				Distance between upper and lower tapings in Water Radiators, for the following heights of Radiators:										
	Width of Inches	Width of Legs, Inches	Thickness of Inches	Water Supply and Return	Single Pipe Steam	Two-pipe Steam		45-in.	38-in.	32-in.	26-in.	23-in.	22-in.	20-in.	18-in.	16-in.	14-in.	13 in.
						$\frac{1}{2}$ "	$\frac{3}{4}$ "											
Rococo—Single-Column ..	4½	5½	2½	4½	4	4½	4	.....	31½	25½	19½	16½	.....	13½	.....	.....	.....	.....
“ Two-Column .....	7¾	8½	2½	4½	4	4½	4	38½	31½	25½	19½	16½	.....	13½	.....	.....	.....	.....
“ Three-Column. ..	9¼	10	2½	4½	4	4½	4	38½	31½	25½	19½	.....	15¾	.....	11½	.....	.....	.....
“ Four-Column.....	10½	11¼	3	4½	4½	4½	4½	38½	31½	25½	19½	.....	15¾	.....	11½	.....	.....	.....
“ Window .....	12½	12½	3	3	3	3	3	.....	.....	.....	.....	.....	.....	15½	.....	11½	.....	8½
Peerless—Single-Column ..	4½	5½	2½	4½	4	4½	4	.....	31½	25½	19½	16½	.....	13½	.....	.....	.....	.....
“ Two-Column .....	7¾	8½	2½	4½	4	4½	4	38½	31½	25½	19½	16½	.....	13½	.....	.....	.....	.....
“ Three-Column....	9	10	2½	4½	4	4½	4	38½	31½	25½	19½	.....	15¾	.....	11½	.....	.....	.....
“ Four-Column ....	10½	11¼	3	4½	4½	4½	4½	38½	31½	25½	19½	.....	15¾	.....	11½	.....	.....	.....
“ Hospital .....	7¾	8½	3	4½	4	4½	4	38½	31½	25½	19½	16½	.....	13½	.....	.....	.....	.....
Verona .....	8	8½	2½	4½	4	4½	4	.....	31½	25½	19½	.....	.....	13½	.....	.....	.....	.....
Italian Flue .....	8½	8½	3	4½	4	4½	4	.....	31½	25¾	19½	.....	.....	13½	.....	.....	.....	.....
Aetna Flue Window.....	12½	12½	3	3	2½	3	2½	.....	.....	.....	.....	.....	.....	15½	.....	11½	.....	8½

# Tapping List of Direct Radiators

## Steam

### One-Pipe Work

Up to 24 square feet, inclusive.....	1	inch
Above 24, up to 60 square feet.....	1¼	inch
Above 60, up to 100 square feet.....	1½	inch
Above 100 square feet.....	2	inch

### Two-Pipe Work

Up to 48 square feet, inclusive.....	1	x	¾	inch
Above 48, up to 96 feet .....	1¼	x	1	inch
Above 96 square feet.....	1½	x	1¼	inch

## Water

### Tapped for Supply and Return

Up to 40 square feet, inclusive.....	1	x	1	inch
Above 40, up to 72 square feet.....	1¼	x	1¼	inch
Above 72 square feet .....	1½	x	1½	inch

---

Vapor tapplings, top and bottom opposite ends; supply, ¾ inches, return, ½ inch.

All air-valve tapplings of Direct Radiators are regularly made ½ inch.


Unless otherwise ordered, all openings of Direct Radiators will have right-hand threads (except that of Wall Radiators where tapped 1½ inch, in which case tapping at one end is right-hand and left-hand on other end).

## Nipples for American Radiators

The sections of AMERICAN Direct Radiators are connected with right and left nipples having 60-degree threads (U. S. Standard).

The joint is made "iron to iron" on the thread—the tightest and strongest joint known to Radiator mechanics. As the nipples are made of heavy malleable iron, the joint is permanent—cannot be affected by rust or the corrosion of any kind of water.

This method of joining sections adds much to the strength of the made-up Radiator. The nipples draw the sections together with such solidity that the Radiator will stand much rough handling in shipment. The connection also makes it very easy to take the sections apart and re-assemble them on the job, whenever necessary to alter the size of a Radiator.



60-Degree Threads  
on Nipple

It adds much to the practical value of AMERICAN direct radiation.



## Classification of Radiator Sections

We herewith publish a classification and naming of direct radiator sections which will give all concerned a more definite method of naming sections when writing out orders.

If the following terms are used in making out orders, their use will insure a definite understanding of requirements at our Branches and Plants, and thus save correspondence and insure prompt shipments of small parts ordered.

“Supply Leg”—To designate end sections connected to supply pipe for two-pipe Steam system.

End section on slip-nipple radiation connected to supply pipe for Water system.

End section on right- and left-hand threaded nipple construction radiation fitted with left-hand thread for nipple.

“Return Leg”—To designate end section on slip-nipple construction radiation connected to return pipe for Water system.

End section on right- and left-hand threaded nipple construction radiation fitted with right-hand threads for nipple.

“Drip Leg”—To designate end section connected to return pipe on a two-pipe Steam system. On right- and left-hand threaded nipple construction radiation this section is fitted with right-hand thread for nipple.

End section connected to piping system on a one-pipe system. On right- and left-hand threaded nipple construction radiation this section is fitted with right-hand thread for nipple.

“Blank Leg”—To designate end section on a one-pipe system not connected to piping system. On right- and left-hand threaded nipple construction radiation this section is fitted with left-hand thread for nipple.

“Center Leg”—To designate intermediate or middle section furnished with feet.

“Loop”—To designate intermediate or middle section.

### Water Radiation for Steam

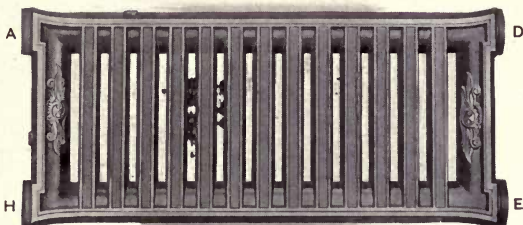
“Supply Leg”—On all water for steam right- and left-hand threaded nipple construction radiation, excepting Aetna Flue, is fitted with left-hand thread for nipple, regardless of one- or two-pipe system.

“Return Leg”—On all water for steam, right- and left-hand threaded nipple construction radiation, excepting Aetna Flue, is fitted with right-hand thread for nipple, regardless of one- or two-pipe system.

NOTE.—It is always advisable in ordering sections for Steam Radiators to state whether for one or two-pipe connections.

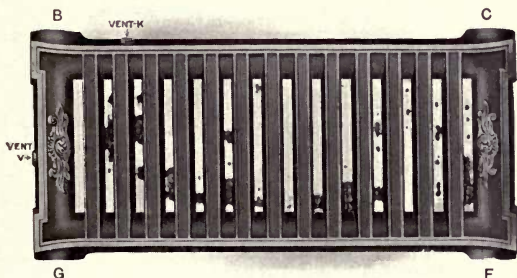
# Rococo Wall Radiators

For Steam or Water



Section—End Tapped

For methods of assembling, see pages 206 to 213 inclusive.



Section—Side Tapped

Rococo Wall Radiator sections are made for two methods of interconnection as follows: One style of section is tapped on the long sides at B, C, G, and F; the other section is tapped on the short sides at A, H, D, and E. A, B, C, and H are left-hand tappings; D, E, F, and G are right-hand tappings.

When more than four tappings are required in one section an extra charge is made for the extra tappings, at 10 cents each, net.

## Sizes and Measurements

Made in three sizes,  $2\frac{3}{8}$  inches thick, or  $3\frac{1}{2}$  inches with bracket.

Extra large,  $29\frac{1}{8}$  inches long,  $13\frac{5}{8}$  inches wide—9 square feet.

Standard,  $21\frac{7}{8}$  inches long,  $13\frac{5}{8}$  inches wide—7 square feet.

Small,  $16\frac{3}{8}$  inches long,  $13\frac{5}{8}$  inches wide—5 square feet.

## Assembling Wall Sections

Connected with  $1\frac{1}{2}$ -inch right- and left-hand internal nipples.

On the inside of each of these right- and left-hand threaded internal nipples are cast two heavy projecting lugs, so that an ordinary piece of  $1\frac{1}{8}$ -inch bar-iron flattened at one end, the length of nipple, can be inserted to any desired point in the Radiator, and by applying wrench to bar the nipple can be screwed or unscrewed and one or more sections may be added to or taken out independently of all the others in the stack. We furnish these bars in 4-foot lengths. (See page 101).

For methods of assembling, see pages 206 to 213 inclusive.

# Rococo Wall Radiators—Continued

## Directions for Ordering

For convenience in shipping and handling:—

Five-foot Radiators assembled end to end as per Figures 11, 12, 13, etc. (see pages 208 and 209), and will be assembled into stacks not larger than four sections.

Seven-foot Radiators assembled end to end, and will be assembled into stacks not larger than three sections.

Nine-foot Radiators assembled end to end, and will be assembled into stacks not larger than two sections.

When assembled side by side, as per Figures 15, 16, 17, etc. (see pages 208 and 209), all the three sizes will be assembled into stacks not larger than five sections.

When fitter intends to erect a stack consisting of more sections than above mentioned, or when the sections or stacks are to be set in rows or series (as shown by illustrations on following pages), we provide a right- and left-hand threaded nipple **having hexagon nut at center**, enabling the fitter to easily connect the stacks or rows on the job.

We carry these sections in two styles of tappings—end-tapped and side-tapped. In ordering please state which arrangement is desired, and this can be done by giving the figure number of illustrations on pages 206 to 213. Where other arrangement is desired, please send sketch showing exactly what is desired.

## Wall Radiator Brackets

### Footed Vertical Brackets “J”

To fit over a  $9\frac{1}{2}$ -inch high baseboard or skirting, and for supporting Wall Radiators, erected vertically. With each “J” Bracket we furnish one  $\frac{1}{4}$ -inch stove-bolt and one button which holds the Radiator in position.

Height from floor to center of supply or return end of lowest tapping:—

J-1 Bracket	.....	$9\frac{1}{2}$ inches
J-2 Bracket	.....	$7\frac{1}{2}$ inches
J-3 Bracket	.....	$5\frac{1}{2}$ inches

### Footed Horizontal Brackets “K”

To fit over baseboard or skirting, and for supporting Wall Radiators, erected horizontally.

With each “K” Bracket we furnish one  $\frac{1}{4}$ -inch stove-bolt and one button. Height from floor to center of supply or return end of lowest tapping:—

K-1 Bracket	will fit over	$11\frac{1}{2}$ -inch high baseboard or skirting	16 In.
K-2 Bracket	“ “ “	$9\frac{1}{2}$ “ “ “ “ “	14 “
K-3 Bracket	“ “ “	$7\frac{1}{2}$ “ “ “ “ “	12 “
K-4 Bracket	“ “ “	$5\frac{1}{2}$ “ “ “ “ “	10 “
K-5 Bracket	“ “ “	$3\frac{1}{2}$ “ “ “ “ “	8 “
K-6 Bracket	“ “ “	$1\frac{1}{2}$ “ “ “ “ “	6 “

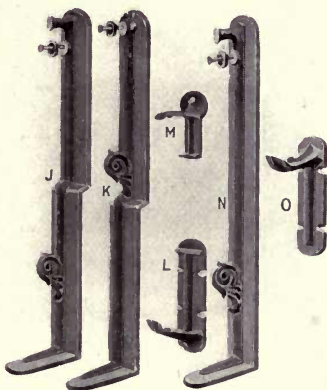
## Rococo Wall Radiators—Continued

### Bracket "L"

Screwed to wall, baseboard, or wainscoting, and supports Radiators set either horizontally or vertically. The "L" Bracket is slotted for four wood screws—not furnished by us. Each section requires for its proper support one "L" and one "M" Bracket.

### Bracket "M"

Screwed to wall, baseboard, or wainscoting, and intended to be used as a guide or to hold in position Radiator supported by Bracket "L" or "O." Each section requires for its proper support one "L" or "O" and one "M" Bracket. The "M" Bracket is slotted for two wood screws—not supplied by us.



### Bracket "N"

Is a straight right-angle Bracket, without offset, for supporting Wall Radiators erected vertically or horizontally; height from floor to center of end tapping bosses,  $5\frac{1}{2}$  inches. With each "N" Bracket we furnish one  $\frac{1}{4}$ -inch stove-bolt and one button.

### Bracket "O"

Screwed to wall, baseboard or wainscoting, and supports underneath section set either horizontally or vertically. Should be used in connection with "M" Bracket for top guide. The "O" Bracket is slotted for four wood screws—not supplied by us.

### Ceiling Bracket "P"

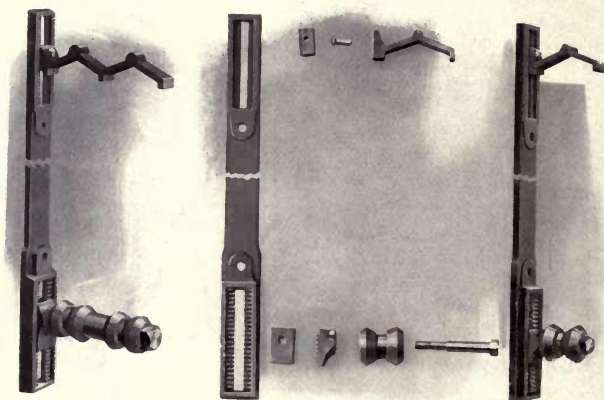
Made of cast plate,  $3\frac{1}{2}$  inches in diameter and screwed to ceiling joists by four screws—not furnished by us. The bolt furnished gives a distance of  $3\frac{1}{2}$  inches to 5 inches from bottom of Radiator to ceiling. Other length bolts can be furnished when specially ordered.

NOTE:—In ordering buttons and stove-bolts separately from brackets, it is necessary to state for which bracket they are wanted, as different lengths of bolts are used for the different brackets.



# Arco Adjustable Wall Brackets

(Patented)



Nos. 12, 22, 32,  
42, and 52

Nos. 1, 2, 3,  
4, and 5

These brackets are designed especially for long runs of Wall Radiator installation in factories, warehouses, theatres, churches, skylights, etc. The radiation rests on the spool at the bottom of the bracket and is held in place by the finger at the top. These parts have a vertical adjustment of 3 inches. This feature of vertical adjustment makes it possible to put up a series of these brackets at a fixed height from the floor and adjust them afterwards so as to get proper drainage on the system. The revolving spool on which the radiator rests also makes horizontal adjustment possible with very little effort. These features save time, labor and expense.

## Sizes and Application

These brackets are made in ten sizes. Nos. 1, 2, 3, 4 and 5, are made to hold five different sizes and arrangements of Rococo Wall Radiators. Nos. 12, 22, 32, 42 and 52, are made to hold five different sizes and arrangements of Rococo Wall Radiators erected two thick. Their uses are as follows:

Nos. 1 and 12, for 5-, 7-, or 9-ft. Rococo Wall Radiators, in horizontal position.

Nos. 2 and 22, for 5-ft. Rococo Wall Radiators in vertical position.

Nos. 3 and 32, for 7-ft. Rococo Wall Radiators in vertical position.

Nos. 4 and 42, for 9-ft. Rococo Wall Radiators in vertical position.

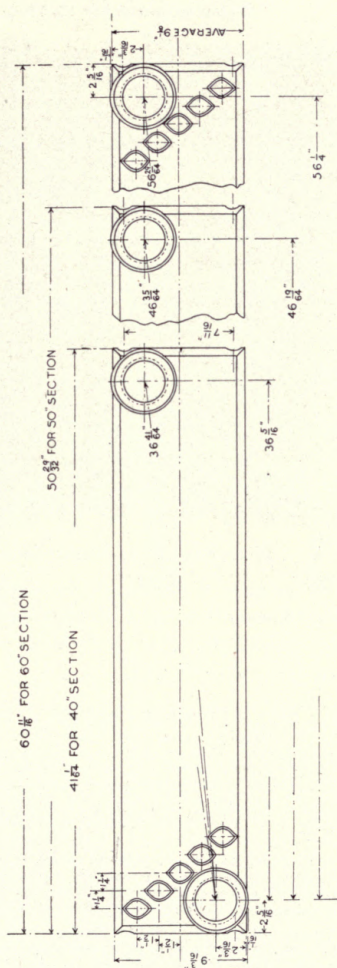
Nos. 5 and 52, for 5-, 7-, or 9-ft. Rococo Wall Radiators, two high, in horizontal position.



## Vento Cast-Iron Hot-Blast Heaters

## Dimensions of Regular Section

The sections of the Vento Heater bear the trade names of 40-inch Section, 50-inch Section, and 60-inch Section, which are merely general designations and do not stand for the exact measurements of length.

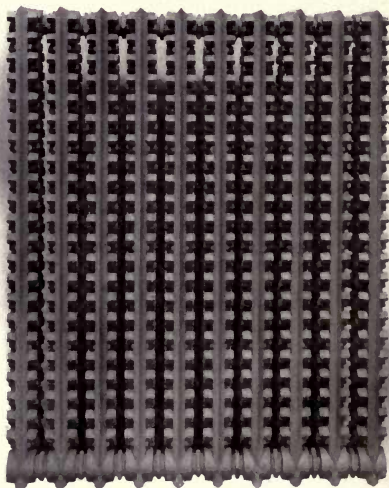


Therefore, for the purpose of exact engineering plans and installations, we are presenting this outline sheet of complete measurements which give the precise data necessary in laying out plans of piping, housing, etc.

# Vento Cast-Iron Heaters

For Fan and Blower Work

(Patented December 15, 1903)



Front View of Ten-Section Stack

Made for Steam or Water, in 40-, 50-, and 60-inch Sections. A great improvement over pipe coils for heating and ventilating work; also for drying work in lumber kilns, laundries, hotels, factories, mills, etc.

## Leading Features

**Few Parts:** Section consists of three parts—main casting and two hexagon nipples. The equivalent coil consists of a base, eight risers, four nipples and eight elbows, or a total of twenty-one pieces—a difference in favor of the Vento Section of 1 to 7.

**Few Joints:** Section is complete with four screwed joints. The equivalent pipe coil requires twenty-four screwed joints, or a difference in favor of the Vento Section of 1 to 6, or one-sixth as many joints.

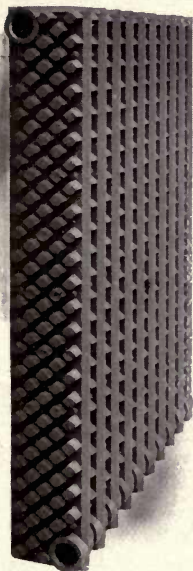
**Simplicity:** Sections are easily handled and transported, and may be carried through doors or windows of any building, and can then be assembled into a complete heater. The equivalent pipe-coil stacks are cumbersome, difficult to handle and transport.

**Small Space:** A complete Vento Heater is compact, and occupies about 15 per cent less space than the equivalent pipe-coil heater. This fact invests the Vento Heater with great value, particularly where space is an important factor.

**Elastic Properties:** The ease and simplicity with which the Vento Heater may be either increased or reduced in its capacity, or repaired, are features which will commend it to architects and heating engineers.

# Vento Cast-Iron Heaters—Continued

For Fan and Blower Work



Regular Section



Narrow Section

## Circulation

A rapid and uniform circulation of the steam is important and is well provided in the Vento Heater by having the steam enter at the top of each section.

The force of the steam carries it through the connecting ports, and drives the air down each of the sections to the air vents at the bottom, thereby securing an even and quick circulation without noise or water-hammer, besides producing equal expansion with no risk of fracture.

In pipe-coil heaters, the base is usually divided into two compartments. The steam enters on one side of the partition and must then rise through a series of one-inch pipes, sometimes 8, or 10 feet, before it can deposit the water of condensation in the return or opposite row of pipes, where it belongs.

The result is that, when using low-pressure steam in cold weather, the condensation is so rapid in the first rows of pipes that a partial vacuum is created, having a tendency to hold the condensation in suspension. The water coming in contact with the intruding steam, causes violent water-hammer and unequal expansion of the base, with consequent liability to breakage. The construction of the Vento Heater prevents such difficulty.

# Vento Cast-Iron Heaters—Continued

## Regular Section—Ratings and Free Areas

Regular 40" Section—10.75 sq. ft. Height,  $41\frac{1}{4}$ ". Width,  $9\frac{1}{8}$ "

Number of Loops in Stack	Sq. Ft. of Heating Surface	5" Cent. of Loops		5 $\frac{3}{8}$ " Cent. of Loops		4 $\frac{5}{8}$ " Cent. of Loops	
		Stand. 44% of Face		52% of Face		47% of Face	
		Net Air Space in Sq. Ft.	Width of Stack in Inches	Net Air Space in Sq. Ft.	Width of Stack in Inches	Net Air Space in Sq. Ft.	Width of Stack in Inches
10	107.50	6.20	50	7.29	54	5.25	46
11	118.25	6.82	55	8.02	59	5.77	51
12	129.00	7.44	60	8.74	65	6.30	55
13	139.75	8.06	65	9.47	70	6.82	60
14	150.50	8.68	70	10.19	75	7.35	65
15	161.25	9.30	75	10.91	81	7.87	69
16	172.00	9.92	80	11.64	86	8.40	74
17	182.75	10.54	85	12.36	91	8.92	79
18	193.50	11.16	90	13.09	97	9.45	83
19	204.25	11.78	95	13.82	102	9.97	88
20	215.00	12.40	100	14.54	108	10.50	92
21	225.75	13.02	105	15.26	113	11.02	97
22	236.50	13.64	110	15.98	118	11.55	102
23	247.25	14.26	115	16.71	124	12.07	106
24	258.00	14.88	120	17.43	129	12.60	111

Regular 50" Section—13.5 sq. ft. Height,  $50\frac{3}{8}$ ". Width,  $9\frac{1}{8}$ "

		5" Centers		5 $\frac{3}{8}$ " Centers		4 $\frac{5}{8}$ " Centers	
10	135.0	7.68	50	9.05	54	6.50	46
11	148.5	8.45	55	9.95	59	7.15	51
12	162.0	9.22	60	10.85	65	7.80	55
13	175.5	9.99	65	11.75	70	8.45	60
14	189.0	10.76	70	12.65	75	9.10	65
15	202.5	11.53	75	13.55	81	9.75	69
16	216.0	12.30	80	14.45	86	10.40	74
17	229.5	13.07	85	15.35	91	11.05	79
18	243.0	13.84	90	16.25	97	11.70	83
19	256.5	14.59	95	17.15	102	12.35	88
20	270.0	15.36	100	18.05	108	13.00	92
21	283.5	16.13	105	18.95	113	13.65	97
22	297.0	16.90	110	19.85	118	14.30	102
23	310.5	17.67	115	20.75	124	14.95	106
24	324.0	18.44	120	21.65	129	15.60	111

Regular 60" Section—16 sq. ft. Height,  $60\frac{1}{4}$ ". Width,  $9\frac{1}{8}$ "

10	160.0	9.21	50	10.85	54	7.81	46
11	176.0	10.13	55	11.93	59	8.59	51
12	192.0	11.05	60	13.00	65	9.37	55
13	208.0	11.97	65	14.08	70	10.15	60
14	224.0	12.89	70	15.15	75	10.93	65
15	240.0	13.81	75	16.23	81	11.71	69
16	256.0	14.73	80	17.31	86	12.49	74
17	272.0	15.65	85	18.39	91	13.27	79
18	288.0	16.57	90	19.46	97	14.05	83
19	304.0	17.50	95	20.54	102	14.83	88
20	320.0	18.42	100	21.62	108	15.61	92
21	336.0	19.34	105	22.70	113	16.39	97
22	352.0	20.26	110	23.78	118	17.17	102
23	368.0	21.18	115	24.85	124	17.95	106
24	384.0	22.10	120	25.93	129	18.73	111

†NOTE.—Add to the width of stack  $2\frac{1}{2}$  inches for staggering of stacks. Approximate weights—Actual, 7.75 per sq. ft. Shipping, 9 lbs. per sq. ft.

# Vento Cast-Iron Heaters—Continued

## Narrow Section—Ratings and Free Areas

Narrow 40" Section—7.5 sq. ft. Height,  $41\frac{1}{4}$ ". Width,  $6\frac{3}{4}$ "

Number of Loops in Stack	Sq. Ft. of Heating Surface	5" Cent. of Loops		5 $\frac{3}{8}$ " Cent of Loops		4 $\frac{3}{8}$ " Cent. of Loops	
		Stand. 44% of Face		52 of Face		37% of Face	
		Net Air Space in Sq. Ft.	Width of Stack in Inches	Net Air Space in Sq. Ft.	Width of Stack in Inches	Net Air Space in Sq. Ft.	Width of Stack in Inches
10	75.0	6.20	50	7.29	54	5.25	46
11	82.5	6.82	55	8.02	59	5.77	51
12	90.0	7.44	60	8.74	65	6.30	55
13	97.5	8.06	65	9.47	70	6.82	60
14	105.0	8.68	70	10.19	75	7.35	65
15	112.5	9.30	75	10.91	81	7.87	69
16	120.0	9.92	80	11.64	86	8.40	74
17	127.5	10.54	85	12.36	91	8.92	79
18	135.0	11.16	90	13.09	97	9.45	83
19	142.5	11.78	95	13.82	102	9.97	88
20	150.0	12.40	100	14.54	108	10.50	92
21	157.5	13.02	105	15.26	113	11.02	97
22	165.0	13.64	110	15.98	118	11.55	102
23	172.5	14.26	115	16.71	124	12.07	106
24	180.0	14.88	120	17.43	129	12.60	111

Narrow 50" Section—9.5 sq. ft. Height,  $50\frac{3}{8}$ ". Width,  $6\frac{3}{4}$ "

		5" Centers		5 $\frac{3}{8}$ " Centers		4 $\frac{3}{8}$ " Centers	
10	95.0	7.68	50	9.05	54	6.50	46
11	104.5	8.45	55	9.95	59	7.15	51
12	114.0	9.22	60	10.85	65	7.80	55
13	123.5	9.99	65	11.75	70	8.45	60
14	133.0	10.76	70	12.65	75	9.10	65
15	142.5	11.53	75	13.55	81	9.75	69
16	152.0	12.30	80	14.45	86	10.40	74
17	161.5	13.07	85	15.35	91	11.05	79
18	171.0	13.84	90	16.25	97	11.70	83
19	180.5	14.59	95	17.15	102	12.35	88
20	190.0	15.36	100	18.05	108	13.00	92
21	199.5	16.13	105	18.95	113	13.65	97
22	209.0	16.90	110	19.85	118	14.30	102
23	218.5	17.67	115	20.75	124	14.95	106
24	228.0	18.44	120	21.65	129	15.60	111

Narrow 60" Section—11 sq. ft. Height,  $60\frac{1}{16}$ ". Width,  $6\frac{3}{4}$ "

10	110.0	9.21	50	10.85	54	7.81	46
11	121.0	10.13	55	11.93	59	8.59	51
12	132.0	11.05	60	13.00	65	9.37	55
13	143.0	11.97	65	14.08	70	10.15	60
14	154.0	12.89	70	15.15	75	10.93	65
15	165.0	13.81	75	16.23	81	11.71	69
16	176.0	14.73	80	17.31	86	12.49	74
17	187.0	15.65	85	18.39	91	13.27	79
18	198.0	16.57	90	19.46	97	14.05	83
19	209.0	17.50	95	20.54	102	14.83	88
20	220.0	18.42	100	21.62	108	15.61	92
21	231.0	19.34	105	22.70	113	16.30	97
22	242.0	20.26	110	23.78	118	17.17	102
23	253.0	21.18	115	24.85	124	17.95	106
24	264.0	22.10	120	25.93	129	18.73	111

Approximate weights—Actual, 7.85 lbs. per sq. ft. Shipping,  $9\frac{1}{4}$  lbs. per sq. ft.

†NOTE.—Add to the width of stack  $2\frac{1}{2}$  inches for staggering of stacks.



# Vento Cast-Iron Heaters—Continued

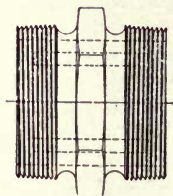
For Fan and Blower Work

## Assembling Sections

Distance between centers can be extended by use of  $2\frac{1}{2}$ -inch heavy cast-iron hexagon nipples of necessary length. Nipples regularly used are  $2\frac{1}{2}$  x 3 inches with 5-inch centers,  $2\frac{1}{2}$  x  $3\frac{3}{8}$  inches with  $5\frac{3}{8}$ -inch centers,  $2\frac{1}{2}$  x  $2\frac{3}{8}$  inches with  $4\frac{5}{8}$ -inch centers.

Nipples are right- and left-hand threaded, as here shown.

**Tappings**— $2\frac{1}{2}$ -inch right-hand on supply end and  $2\frac{1}{2}$ -inch left-hand on return end, and bushed to size required. Inside tappings on all bushings furnished with right-hand threads unless otherwise ordered.



Hexagon Nipple

If desired, we can furnish feed sections tapped 3 or  $3\frac{1}{2}$  inches. The return tappings are always  $2\frac{1}{2}$  inches, unless ordered bushed to size required.

NOTE.—Standard spacing of sections is on 5-inch centers.

## Air Vent Tappings

Both end sections of each stack have a  $\frac{1}{4}$ -inch tapping for air vent located 8 inches from bottom of section and are plugged when shipped.

Where steam and return are on opposite ends there should be an air vent on both ends; steam and return on same end, air vent should be placed on same end. Limit of number of sections where feed and return are on same end not to exceed 18 sections. Limit where feed and return are on opposite ends, 24 sections.

## To Figure Size and Capacity of a Heater

Take for example, a Heater consisting of six stacks, each containing ten 60-inch sections. The Regular Sections are  $9\frac{1}{8}$  inches wide and these six stacks will set on 10-inch centers in the heater, so that the heater will be 60 inches deep in the direction of air flow. Total heating surface in this heater will be 6 x 160 square feet, which equals 960 square feet.

The Narrow Sections are  $6\frac{3}{4}$  inches wide and these six stacks will set on  $7\frac{1}{2}$ -inch centers in the heater, so that the heater will be 45 inches deep in the direction of air flow.

# Vento Cast-Iron Heaters—Continued

## For Fan and Blower Work

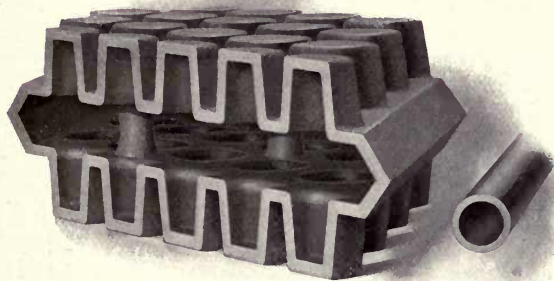
Total heating surface in this heater will be 6 x 110 square feet, which equals 660 square feet.

The height of the heater (either Regular or Narrow Section) will be  $60\frac{1}{8}$  inches, and the width will depend on the centers of the sections in the stack. If the standard 5-inch spacing is used the width of a 10-section stack will be 50 inches plus  $2\frac{1}{2}$  inches for staggering of stacks—making the total width of the heater  $52\frac{1}{2}$  inches.

## Double Tiering

Stacks of sections may be double-tiered—using any combination of heights, so as to give any height desired. Special cases of this kind are illustrated in our Vento catalogue

## Diagonal Cross-Section View



Cross-sections of 1-inch pipe (area of 0.7854 sq. in.), and also of the Vento Regular Section (area of 8.8 sq. in.)

## Vento Nipple Wrench

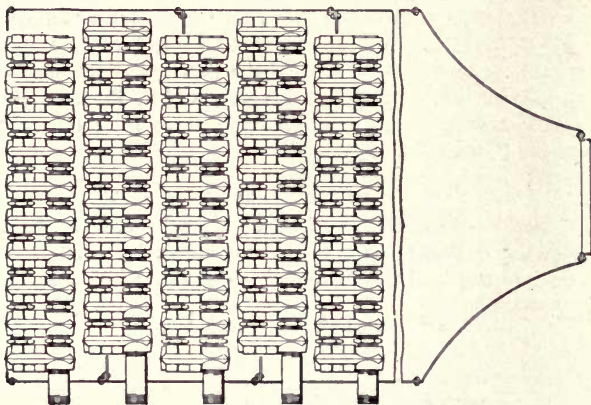
For Vento Sections the wrench shown on page 101 will be found most practical. Made of drop-forged steel, for right- and left-hand threaded nipples having a hexagon nut at the center. It has a 3-inch opening to engage the nut of a  $2\frac{1}{2}$ -inch nipple and is strong and durable.

Send for complete Vento catalogue, containing Temperature and Condensation Charts and Special Information.

# Vento Cast-Iron Heaters—Continued

## Assembling and Testing

The illustration herewith shows a top view of the Vento Heater and the plan of staggering the sections.



Patented Dec. 15, 1903

Grooves are provided on the bottom of each section for rods made of  $\frac{1}{2}$ -inch iron pipe, which form a bearing for rolls of  $\frac{3}{4}$ -inch pipe placed transversely and about 12 inches apart. This method permits free expansion and contraction; and gives an air space under the Heater, thereby adding to its efficiency.

Expansion and contraction, tensile strength, etc., have been given the most severe tests under varying degrees of the initial air temperature above and below zero, with high and low fan velocity, using both live and exhaust steam pressures. Each section is subjected at the Plant to a hydrostatic test of 100 pounds to the square inch.

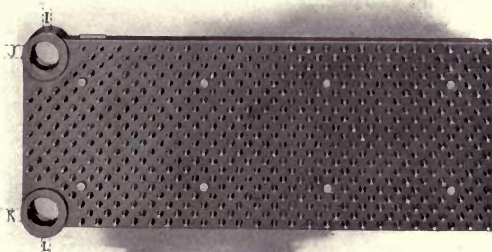
The severity of these tests fully determines the reliability of this cast-iron construction and permits of a wide margin of safety, as operating pressures in ordinary practice are less than 10 pounds to the square inch.

## Shipments

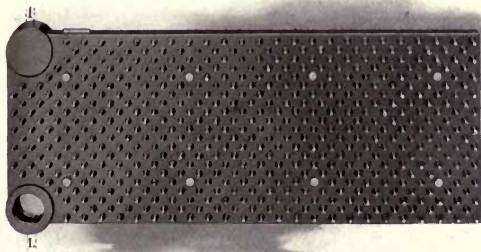
Unless otherwise ordered, we ship the Vento Heater in blocks of five sections, which are firmly bolted together with blocks of wood placed between the sections, so that it is almost impossible for the Vento stack to arrive at point of destination in bad order. As each block is easily handled, our shipments have a great advantage over pipe-coil heaters, which may be strained or damaged by reason of large units and heavy weights.

# Sanitary School Pin Indirect Radiators

For Steam and Water



Section for Water



Section for Steam

Each section contains 20 square feet of heating surface. Length  $36\frac{1}{8}$  inches. Height,  $13\frac{3}{8}$  inches. Height at connecting point, on regular pins,  $15\frac{1}{4}$  inches. When special tappings (2 inches or smaller) are at "I," or "L," height at connecting point is  $15\frac{1}{2}$  inches. When tapping is at "J" or "K," length is  $36\frac{3}{8}$  inches.

Width each section occupies in stack, 4 inches. If other distances between centers are desired we can furnish nipples giving a distance of  $3\frac{3}{4}$ ,  $4\frac{1}{4}$ , or  $4\frac{1}{2}$  inches from center to center of assembled sections.

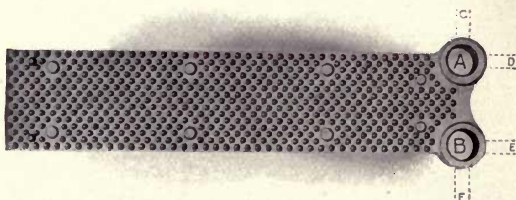
These Indirects are tapped 2 inches, right-hand on supply end and left-hand on the return, and can be bushed to such smaller size as is desired. When tappings are bushed smaller, the inside tappings in bushings will be right-hand, unless otherwise ordered.

Connected with extra heavy 2-inch right- and left-hand threaded nipples, having hexagon nut at center. Steam sections are always shipped separately. Water sections are shipped separately unless otherwise ordered; when ordered assembled they are shipped in stacks of five or six sections.

For distance between centers and free-air area between sections of Indirect Radiators, see page 215.

# Perfection Pin Indirect Radiators

For Steam or Water  
With Right- and Left-Hand Threaded Nipples



"Standard" size, single section, with extra-heavy right- and left-hand threaded nipple connections with hexagon nut in center.

Each section of Perfection Pin Indirect "Standard" size, with right- and left-hand threaded nipple connections, contains 10 square feet of heating surface. Length,  $36\frac{1}{4}$  inches. Height,  $7\frac{1}{2}$  inches. Height at connecting point,  $9\frac{1}{8}$  inches. Width each section occupies in stack,  $2\frac{3}{4}$  inches. If greater distance between centers is desired, we can furnish extra long nipples, giving a distance of  $3\frac{1}{4}$ ,  $3\frac{1}{2}$ , or  $3\frac{3}{4}$  inches between centers of standard size.

Each section of Perfection Pin Indirect "Extra Large" size, with right- and left-hand threaded nipple connections, contains 15 square feet of heating surface. Length,  $36\frac{1}{4}$  inches. Height,  $11\frac{1}{2}$  inches. Height at connecting point, 14 inches. Width each section occupies in stack,  $2\frac{7}{8}$  inches; or, when specially ordered, can be increased to  $3\frac{1}{8}$ ,  $3\frac{3}{8}$ ,  $3\frac{5}{8}$ , or  $3\frac{7}{8}$  inches between centers.



Complete Stack (sections are shipped separately unless otherwise ordered; when ordered assembled are shipped in stacks of five or six sections). "Standard" and "Extra Large" sizes are tapped 2 inches and can be bushed to such smaller size as is desired.

Openings will have 2-inch right-hand tapping on one side and 2-inch left-hand tapplings on the other. Connected with extra-heavy 2-inch right- and left-hand threaded hexagon nipples. When tapplings are bushed to smaller sizes, the inside tapplings in bushings will be right-hand unless otherwise ordered.

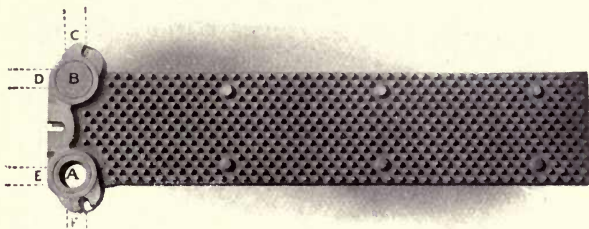
If location of tapping is desired other than regular, we can furnish these Radiators, when specially ordered, in the "Extra Large" size with special tapplings at "A," "B," "C," "D," "E," and "F," 2 inches or smaller; the "Standard" size can be tapped 2 inches or smaller at "A" and "B," and  $1\frac{1}{4}$  inches or smaller at "C," "D," "E," and "F." For distance between centers and free-air area between sections of Indirect Radiators, see page 215.



# Perfection Pin Indirect Radiators

For Steam or Water

With Flange and Bolt Connections



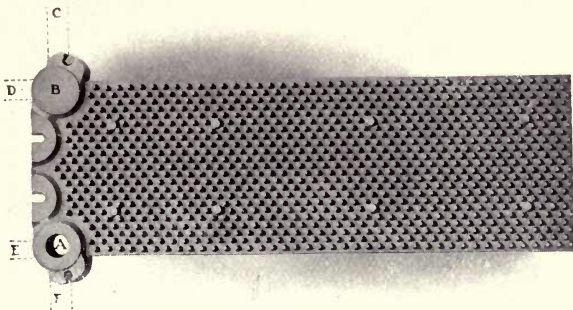
**"Standard" Size, Single Section, with Bolt and Flange Connections**

Both "Standard" and "Extra Large" sizes are tapped 2 inches, and can be bushed to such smaller size as is desired.

All openings will have right-hand threads unless otherwise ordered.

If location of tappings is desired other than regular, as shown by "A" in cut, we can furnish special tappings at "B," 2 inches or smaller; "C" or "F,"  $1\frac{1}{4}$  inches or smaller; "D" or "E,"  $1\frac{1}{4}$  inches or smaller.

Each section of Perfection Pin Indirect "Standard" size contains 10 square feet of heating surface. Length,  $36\frac{1}{4}$  inches. Height,  $7\frac{1}{2}$  inches. Height at connecting point,  $11\frac{1}{2}$  inches. Width each section occupies in stack,  $2\frac{3}{4}$  inches. For table of air areas, see page 215.

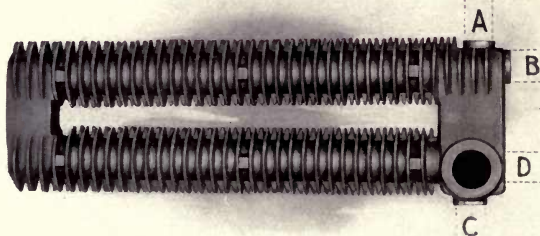


**"Extra Large" Size Section with Bolt and Flange Connections**

Each section of Perfection Pin Indirect "Extra Large" size contains 15 square feet of heating surface. Length,  $36\frac{1}{4}$  inches. Height,  $11\frac{1}{2}$  inches. Height at connecting point,  $15\frac{1}{2}$  inches. Width each section occupies in stack,  $2\frac{7}{8}$  inches.

The assembling of these Radiators is a very simple matter and consequently they are always shipped in separate sections which can be assembled one at a time in the cradle which is used to support them in place.

# Excelsior Junior Indirect Steam Radiators



Single Section—showing Special Tappings

Each section of Excelsior Junior Indirect Steam Radiator contains 8 square feet of heating surface.

Length of section,  $23\frac{3}{4}$  inches. Height, 8 inches.

Width each section occupies in stack,  $3\frac{3}{8}$  inches; or, when specially ordered connected with extra-long nipples, to give additional air area between sections:  $3\frac{5}{8}$ ,  $3\frac{7}{8}$ ,  $4\frac{1}{8}$ , or  $4\frac{3}{8}$  inches.

The nipples for connecting sections are extra-heavy  $1\frac{1}{2}$ -inch, right-and left-hand threaded, with hexagon nut at the center. Sections are shipped separately unless otherwise specified; when ordered assembled, are shipped in stacks of five or six sections.

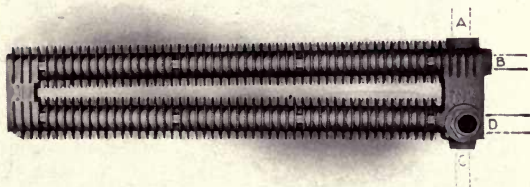
Regular tapping is  $1\frac{1}{2}$ -inch; supply tapping has right-hand thread; return tapping, left-hand thread. If smaller than  $1\frac{1}{2}$ -inch tapping be required for Excelsior Junior Steam Indirect, a  $1\frac{1}{2}$ -inch nipple and a reducing elbow should be used, instead of a bushing, to avoid interference with diaphragm opening. As these tapped openings should never be bushed, we do not, under any circumstances, ship them with bushings.

If location of tapping is desired other than regular, we can furnish special tappings as shown in above cut: "A,"  $1\frac{1}{2}$ -inch tapping or smaller; "B,"  $1\frac{1}{4}$ -inch tapping or smaller; "C,"  $1\frac{1}{4}$ -inch tapping or smaller. For distance between centers and free-air area between sections of Indirect Radiators, see page 215.

For Cooling Coil Installations, see page 214.

# Excelsior Indirect Radiators

For Steam and Water



**Excelsior Indirect Steam Section—showing Special Tappings**

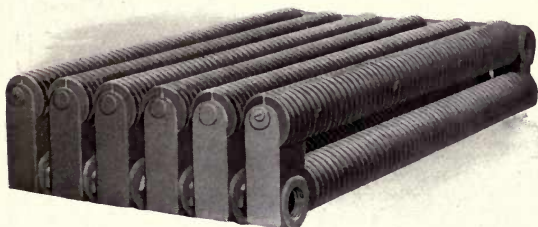
Length of Excelsior Indirect Steam Section, 36 inches.  
Excelsior Indirect Hot-Water Section,  $36\frac{3}{4}$  in. Height, 8 in.

Width occupied in stack,  $3\frac{3}{8}$  inches; or, when specially ordered connected with extra long nipples, to give additional air area between sections,  $3\frac{5}{8}$ ,  $3\frac{7}{8}$ ,  $4\frac{1}{8}$ , and  $4\frac{3}{8}$  inches. Each section contains 12 square feet of heating surface in both Steam and Hot Water. Sections are shipped separately unless otherwise ordered; when ordered assembled are shipped in stacks of five or six sections.

Connected with extra-heavy  $1\frac{1}{2}$ -inch right- and left-hand threaded nipples, having hexagon nut at the center.

Regular tapping is  $1\frac{1}{2}$ -in.; supply tapping has right-hand thread, return tapping, left-hand thread. If smaller than  $1\frac{1}{2}$ -in. tapping be required for Excelsior Steam Indirect, a  $1\frac{1}{2}$ -in. nipple and a reducing elbow should be used, instead of a bushing, to avoid interference with diaphragm opening.

As openings should never be bushed, we do not under any circumstances ship stacks with less than  $1\frac{1}{2}$ -inch opening.

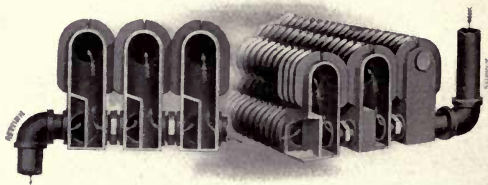


**Excelsior Indirect Water Radiator—Complete Stack**

If location of tapping is desired other than regular, we can furnish special tappings as shown above: "A,"  $1\frac{1}{2}$ -inch tapping or smaller; "B,"  $1\frac{1}{4}$ -inch tapping or smaller; "C,"  $1\frac{1}{4}$ -inch tapping or smaller. For distance between centers and free-air area between sections of Indirect Radiators see page 215.

For Cooling Coil Installations, see page 214.

## Excelsior Indirect Radiators—Continued



### Steam Indirect Connections

The above cut shows:—

**FIRST.**—The supply pipe attached, as it should always be, to the right-hand side of stack, and return pipe to the left-hand side.

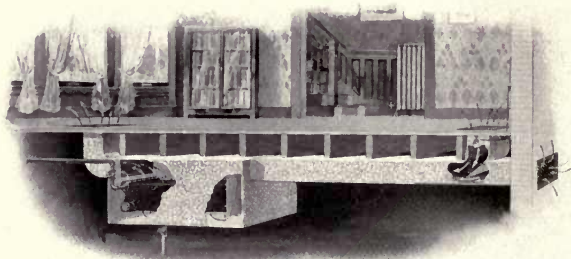
**SECOND.**—The distance between the sections should be set from each other which should be so the flanges will interlock about  $\frac{1}{8}$ -inch. When specially ordered, however, sections will be connected with extra long nipples, to give additional air area between the sections.

**THIRD.**—The diaphragm or partition; its location and shape; which is such as to make the circulation of steam absolutely positive, and also allow the water of condensation to pass freely under it and directly to the return pipe. Because of this diaphragm, bushings should not be used.

**FOURTH.**—The air vent should be placed on the return connection or close to same.

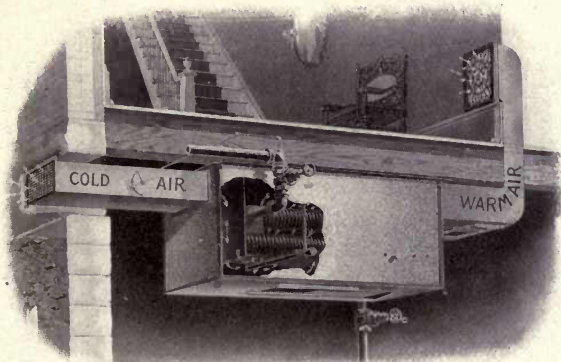
### Directions for Setting Steam Indirect

Hangers made of  $\frac{1}{2}$ -inch or  $\frac{5}{8}$ -inch round iron having coach screw threads at one end and an eye or ring turned at the other end large enough to receive 1-inch or  $1\frac{1}{4}$ -inch iron pipe, may be easily screwed to the joists or timbers overhead. Those hangers are usually placed one at each side of the four corners about 6 inches from the end and opposite each other, so that the horizontal pipe support may pass through the rings or eyes. The hanger supporting the return end of the stack should be slightly lower ( $\frac{1}{4}$  to  $\frac{1}{2}$  inch) than the others, so that the water of condensation may have a positive flow toward the return connection. The distance from the top of the stack to the ceiling should be from 10 to 12 inches, and the air space below the stack to the bottom of the casing, from 6 to 8 inches. The ceiling over the stack is usually covered with galvanized iron or tin.



The illustration shows a good method for incasing indirect radiation, and also suggests a simple way to secure rotary circulation of the air in the room when it becomes desirable to shut off the outdoor supply.

# Excelsior Indirect Radiators—Continued



## Hot Water Connections

The flow connection to the indirect stack is made to the upper side or end supply tapping, and the return connection is taken from the lower tapping on the opposite side.

When the flow-pipe, as shown in the illustration, is at the highest point of its connection to the stack, the air vent must be taken from there, either by attaching an air valve or connecting a  $\frac{1}{4}$ -inch or  $\frac{3}{8}$ -inch iron pipe and carrying same to the expansion pipe or nearest riser. If the flow connection, however, pitches downward from an overhead main to the stack, no special air vent will be required.

The illustration shows a good method for encasing the indirect stack and introducing the fresh air through a galvanized iron duct and delivering the warm air through a side-wall register.

Directions for setting are similar to those given for steam on the preceding page.

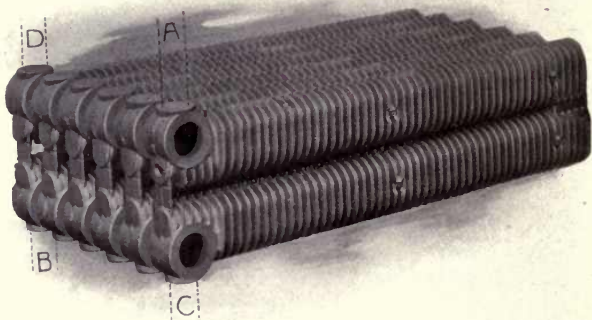
## Data for Excelsior Indirect Steam Radiators

Heat- ing Sur- face	Cold Air Sup- ply	Diam- eter of Duct if Round	Hot- Air Flue	Size for Brick Work if Hot-Air Flues Inches	Size of Regis- ter	Ratio of 1 to 30	Ratio of 1 to 35	Ratio of 1 to 40
Sq. ft.	Sq. in.	Inches	Sq. in.		Inches	Cu. ft.	Cu. ft.	Cu. ft.
24	36	6.8	48	4x12	8x 8	720	840	960
36	54	8.3	72	8x12	9x12	1080	1260	1440
48	72	9.6	96	8x12	10x14	1440	1680	1920
60	90	10.0	120	12x12	12x15	1800	2100	2400
72	108	11.7	144	12x12	12x19	2160	2520	2880
84	126	12.7	168	12x16	14x22	2520	2940	3360
96	144	13.5	192	12x16	14x24	2880	3360	3840
108	162	14.4	226	12x20	16x20	3240	3780	4320
120	180	15.2	240	12x20	16x24	3600	4200	4800
132	198	15.9	264	12x24	20x20	3960	4620	5280
144	216	16.6	288	12x24	20x24	4320	5040	5760



# Cardinal Indirect Radiators

For Steam or Water



Complete Stack

Each section of Cardinal Indirect contains 15 square feet of heating surface.

Length of section,  $37\frac{1}{4}$  inches; height, at connecting end,  $11\frac{1}{4}$  inches; at opposite end  $9\frac{1}{4}$  inches.

Width each section occupies in stack,  $3\frac{1}{2}$  inches; or, when specially ordered connected with extra long nipples, to give additional air area between sections, can be increased to  $3\frac{3}{4}$ , 4,  $4\frac{1}{4}$ , or  $4\frac{1}{2}$  inches.

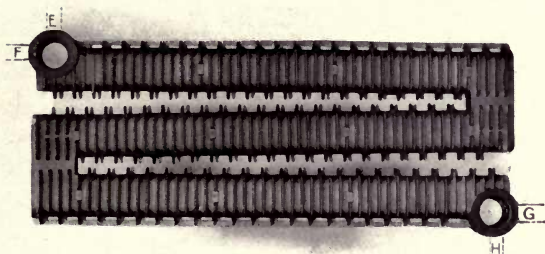
The nipples used for connecting sections are extra-heavy 2-inch, right- and left-hand threaded, with hexagon nut at the center. Sections are shipped separately unless otherwise specified; when ordered assembled, are shipped in stacks of five or six sections.

Regular tapping is 2 inches, and can be bushed to any smaller size desired. Supply tapping has right-hand thread; return tapping, left-hand thread — unless otherwise ordered. But when Radiator is wanted tapped smaller than 2 inches, the tapping within the bushing is right-hand, unless otherwise ordered.

If location of tapping is desired other than regular, we can furnish special tappings, as shown in above illustration, "A" or "C,"  $1\frac{1}{2}$ -inch tapping or smaller; "B" or "D,"  $1\frac{1}{2}$ -inch tapping or smaller. For distance between centers and free-air area between sections of Indirect Radiators see page 215.

# Sterling Indirect Radiators

For Steam or Water



Single Section

Each section of Sterling Indirect contains 20 square feet of heating surface. Length of section,  $36\frac{3}{4}$  inches. Height,  $15\frac{3}{4}$  inches.

Width each section occupies in stack,  $3\frac{1}{2}$  inches; or, when specially ordered this can be increased to  $3\frac{3}{4}$ , 4,  $4\frac{1}{4}$ , or  $4\frac{1}{2}$  inches, by using extra long nipples, to give additional air area between sections. Sections are shipped separately unless otherwise ordered; when ordered assembled are shipped in stacks of five or six sections.

The nipples used for connecting sections are extra-heavy 2-inch right- and left-hand threaded, with hexagon nut at the center.

Unless otherwise ordered, Sterling Indirects are tapped 2 inches right-hand on supply end, and 2 inches left-hand on return end, and can be bushed to any smaller size desired.

If location of tapping is desired other than regular, we can furnish special tapplings as shown in above illustration at "E," "F," "G," or "H,"  $1\frac{1}{2}$  inches or smaller.

For distance between centers and free-air area between sections of Indirect Radiators, see page 215.

## Data on Indirect Radiators

All AMERICAN Indirect Radiators are shipped with sufficient nipples to put the stack together on the job.

If the sections are assembled at our Plants an extra charge is made for the work.

All indirect air-valve tappings are regularly made  $\frac{3}{8}$  inch.

### Measurements

Length of Section	Ex-treme Height	Pattern Name	Heat-ing Surface	Width Each Section Occu-pies in Stack Inches †	Regu-lar Tap-ping
23 $\frac{3}{4}$	8	Excelsior Junior Steam.	8	3 $\frac{3}{8}$	†1 $\frac{1}{2}$
36	8	Excelsior Steam.....	12	3 $\frac{3}{8}$	†1 $\frac{1}{2}$
36 $\frac{3}{4}$	8	Excelsior Water.....	12	3 $\frac{3}{8}$	†1 $\frac{1}{2}$
36 $\frac{1}{4}$	11 $\frac{1}{2}$	Perfection Flange and Bolt, standard size, Steam or Water.....	10	2 $\frac{3}{4}$	*2
36 $\frac{1}{4}$	15 $\frac{1}{2}$	Perfection Flange and Bolt, extra-large size, Steam or Water.....	15	2 $\frac{7}{8}$	*2
36 $\frac{1}{4}$	9 $\frac{13}{16}$	Perfection Right & Left Threaded, standard size, Steam or Water	10	2 $\frac{3}{4}$	*2
36 $\frac{1}{4}$	14	Perfection Right & Left Threaded, extra-large size, Steam or Water.	15	2 $\frac{7}{8}$	*2
37 $\frac{1}{4}$	11 $\frac{1}{4}$	Cardinal, Steam or Water	15	3 $\frac{1}{2}$	2
36 $\frac{3}{4}$	15 $\frac{3}{4}$	Sterling, Steam or Water	20	3 $\frac{1}{2}$	*2
36 $\frac{1}{8}$	15 $\frac{1}{4}$	Sanitary School Pin, Steam or Water.....	20	4	*2

\*These Radiators are all regularly tapped 2 inches, and bushed according to the size specified in order.

†When greater air space is desired between the sections we can so furnish on special order.

‡Bushing reduction cannot be made. (See page 124.)

## 85% Magnesia Pipe-Covering

Stock No. 400

For Low- and High-Pressure Steam Pipes



Composed of Magnesia and Asbestos Fiber. The Asbestos is of unusually long fiber, which also serves as a thorough binder, and with the outer shell or wrapper of canvas makes a very durable as well as an excellent non-conductor. Is made in sections 3 feet

long. Sections are cut lengthwise through the center, and price includes necessary bands to hold in position on the piping. Gives the maximum amount of protection against loss of heat.

See Price List, page 130.

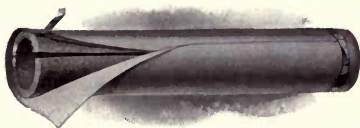
## Wool-Felt Coverings

Stock No. 401

For Hot-Water Pipes

Can be furnished in  $\frac{3}{8}$ -inch,  $\frac{5}{8}$ -inch, and  $\frac{7}{8}$ -inch thicknesses;  $\frac{3}{8}$ -inch will be shipped unless otherwise specified.

Composed of successive layers of soft wool-felt lined with asbestos sheathing and furnished with canvas jacket and necessary bands. Supplied in sections 3 feet long, cut lengthwise through the center.



See Price List, page 130.

## Asbestocel Covering

Stock No. 399

For Covering Pipe and Fittings



A pipe-covering made up in layers of plain and corrugated (or ribbed) asbestos paper. Better than the usual air-cell type, being built on the arch principle—that is, the corrugations or ribs run around the pipe instead of lengthwise, and keep out all circulation of outer air, thus keeping the heat in the pipe and saving coal.

Full Section showing Corrugations

Furnished in sections 3 feet long, neatly finished with canvas and bands.

Made in thicknesses  $\frac{1}{2}$  to 3 inches to fit Standard Pipe  $\frac{1}{2}$  to 16 inches in diameter.

See Price List, page 130.

# Air-Cell Pipe Covering

Stock No. 398



Formed by alternate layers of plain and corrugated (or ribbed) asbestos paper running lengthwise of the pipe. A good form of covering, giving full protection to the pipe.

Supplied in sections 3 feet long and cut lengthwise through the center. Neatly finished with canvas and bands.

Can furnish in  $\frac{1}{2}$ ,  $\frac{3}{4}$ , and 1 inch thicknesses.

## Asbestos, Wool-Felt, Asbestocel, and Air-Cell Price List

Inside Diameter of Pipe	Price Per Lineal Foot	Elbows	Tees	Globe Valves
$\frac{1}{2}$ in.	\$ .22	\$ .30	\$ .36	\$ .54
$\frac{3}{4}$ "	.24	.30	.36	.54
1 "	.27	.30	.36	.54
$1\frac{1}{4}$ "	.30	.30	.36	.54
$1\frac{1}{2}$ "	.33	.30	.36	.54
2 "	.36	.36	.42	.60
$2\frac{1}{2}$ "	.40	.42	.48	.78
3 "	.45	.48	.54	.96
$3\frac{1}{2}$ "	.50	.54	.60	1.20
4 "	.60	.60	.75	1.50
$4\frac{1}{2}$ "	.65	.72	.90	1.85
5 "	.70	.90	1.20	2.25
6 "	.80	1.30	1.60	2.80
7 "	1.00	1.80	2.20	3.60
8 "	1.10	2.40	3.00	4.40
9 "	1.20	3.00	3.80	5.30
10 "	1.30	3.60	4.60	6.20
12 "	1.85			
Out. Diam.		Use Cement or Blocks for fittings larger than 10 inches and for all flanged and irregular fittings.		
14 in.	2.10			
16 "	2.35			
18 "	2.60			
20 "	2.85			
24 "	3.30			
30 "	4.00			



# Ideal Asbestos Cement

Stock No. 402

IDEAL Asbestos should be applied to a warm surface in thin coats: the first coat should be left a rough surface and allowed to dry. Mix with water and apply with a trowel, finishing with a wet brush. When dry give a coat of paint; or when applying last coat, mix Asbestos half and half with Portland Cement; final coat should be about  $\frac{1}{8}$ -inch thick, with a very hard finish.

Amount of Cement required to cover IDEAL Boilers  $1\frac{1}{4}$  inches thick:—

Arco Boilers		No. of Boiler	Lbs.	No. of Boiler	Lbs.
No. of Boiler	Lbs.	25-2-W	175	28-7	650
1-19-S or W	125	25-3-W	175	28-8	725
2-19-S or W	150	25-4-W	200	36-5	575
3-19-S or W	175	28-1-W	175	36-6	650
1-22-S or W	150	28-2-W	200	36-7	725
2-22-S or W	175	28-3-W	200	36-8	800
3-22-S or W	200	28-4-W	225	36-9	875
1-25-S or W	175	31-1-W	200	48-6	850
2-25-S or W	200	31-2-W	225	48-7	950
3-25-S or W	225	31-3-W	250	48-8	1050
1-28-S or W	200	31-4-W	275	48-9	1150
2-28-S or W	250	34-1-W	225	48-10	1250
3-28-S or W	275	34-2-W	250		
1-31-S or W	250	34-3-W	275		
2-31-S or W	300	34-4-W	300		
3-31-S or W	325				
1-34-S or W	300				
2-34-S or W	350				
3-34-S or W	375				
Standard Boilers		Sectional Steam and Water		Premier Steam and Water	
15-1-W	75	15-4	100	1015 or 1115	125
17-1-W	100	15-5	125	2015 or 2115	150
17-2-W	100	15-6	150	3015 or 3115	175
17-3-W	125	19-5	240	1018 or 1118	150
19-1-W	100	19-6	280	2018 or 2118	175
19-2-W	125	19-7	320	3018 or 3118	200
19-3-W	125	22-5	275	1021 or 1121	175
22-1-W	125	22-6	325	2021 or 2121	200
22-2-W	150	22-7	375	3021 or 3121	225
22-3-W	150	25-5	350	4021 or 4121	250
22-4-W	175	25-6	400	1024 or 1124	200
25-1-W	150	25-7	450	2024 or 2124	225
		25-8	500	3024 or 3124	250
		28-5	500	4024 or 4124	275
		28-6	575	1027 or 1127	225
				2027 or 2127	250
				3027 or 3127	275
				4027 or 4127	300

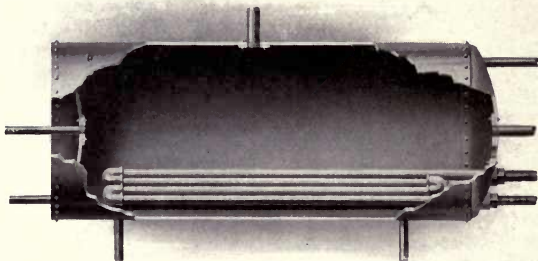
On Boilers not listed here estimate 6 pounds to the square foot— $1\frac{1}{4}$  inches thick.

## List Prices

Asbestos Cement, per bag of 100 pounds.....\$3.00

# Steel Storage Tanks

With or Without Coil



Showing location of Tank tapplings, vertical or horizontal.  
Coil openings vary according to size and shape of coil.

## Important Information

All tanks listed on pages 134 and 135 can be furnished galvanized.

Orders for tanks with coils or in any way special, not subject to cancellation.

Tank legs, per set of three—List Price \$3.00. (See page 43.)

All tanks with coils provided with tapping for IDEAL Syphon Tank Regulator. (See page 158.)

In ordering, state whether vertical or horizontal tanks are wanted. Unless otherwise ordered, tanks without coils or manholes will be shipped, and tapplings located as per cut above. All openings tapped for 2-inch pipe and reinforced.

Tanks without manholes are made with one concave and one convex head. Tanks with manholes have both heads convex.

## Special Note

The quality of the material used and the method of construction make these tanks first class in every particular. Attention is called to the gauge of thickness of shells and heads employed in the manufacture both of the Storage and Extra-Heavy Storage Tanks. When these tanks are to be subjected to sudden or unusual pressure, as in the case where tanks are connected direct to City Pumping Station and the pressure is increased during times of conflagrations or the like, we can build tanks of greater gauge or thickness of metal or it is recommended the system be equipped with Water-Pressure Reducing Valve.

Prices of special tanks furnished on application.

# Coils for Storage Tanks

We can, upon special order, equip Tanks with return bend coils, at extra charge, as per list below. Size of coil must be determined by heating-contractor, who alone is familiar with all the conditions surrounding installation.

## List Prices for Coils

Prices are per lineal foot, and include necessary return bends and lock nuts, and provide for placing coil in tank.

Spiral coils can be furnished. Prices on application.

Coil made of.....	1 in.	1 ¼ in.	1 ½ in.	2 in.
Black iron pipe with black return bends and lock nuts. ....	\$ .50	\$ .60	\$ .65	\$ .85
Galvanized iron pipe with galvanized return bends and lock nuts...	.60	.70	.80	1.10
Brass (iron pipe size) pipe with brass return bends and lock nuts..	1.50	2.15	2.40	3.00
Tinned brass (iron pipe size) pipe with tinned brass return bends and lock nuts.....	1.90	2.70	3.10	4.45
Copper (iron pipe size) pipe with tinned brass return bends and lock nuts.....	1.95	2.80	3.15	4.60

Approximate weights per foot: 1 inch, 4 pounds; 1 ¼ inches, 4 ½ pounds; 1 ½ inches, 5 pounds; 2 inches, 7 pounds.

A standard coil is one constructed with Return Bends and made of four pipes, the lineal feet being as follows (including Return Bends) for the various lengths of tanks.

Tank —	48 inches long,	14 lineal feet
Tank —	60 inches long,	18 lineal feet
Tank —	72 inches long,	22 lineal feet
Tank —	84 inches long,	26 lineal feet
Tank —	96 inches long,	30 lineal feet
Tank —	108 inches long,	34 lineal feet
Tank —	120 inches long,	38 lineal feet

We recommend 1	-inch Pipe on Tanks of 20 and 22 inches diameter
" " 1 ¼-inch	" " " 24 " 30 " "
" " 1 ½-inch	" " " 36 " "
" " 2-inch	" " " 42 " 48 " "

It is advisable to have a manhole in head of all tanks containing coils. This should be remembered when figuring. Quotations will upon application be promptly furnished on styles and sizes of coils other than above.

# Black Steel Storage Tanks

Thickness of shell  $\frac{3}{8}$  in. Heads  $\frac{1}{4}$  in. All seams single riveted

No.	Size Inches	Capacity Gallons	Weight Pounds	List Price
409	18 x 36	40	200	\$ 41.00
410	18 x 48	53	250	45.00
411	18 x 60	66	290	49.00
412	18 x 72	79	330	54.00
413	18 x 84	92	370	58.00
414	18 x 96	106	410	62.00
415	20 x 48	65	275	47.00
416	20 x 60	82	320	51.00
417	20 x 72	98	360	55.00
418	24 x 36	71	280	46.00
419	24 x 42	82	300	49.00
420	24 x 48	94	335	52.00
421	24 x 60	117	390	57.00
422	24 x 72	141	440	62.00
423	24 x 84	164	500	68.00
424	24 x 96	188	550	74.00
425	24 x 108	212	600	80.00
426	24 x 120	235	660	86.00
427	30 x 36	110	365	56.00
428	30 x 48	147	430	61.00
429	30 x 60	184	495	67.50
430	30 x 72	221	560	73.00
431	30 x 84	258	640	81.00
432	30 x 96	294	700	88.50
433	30 x 108	335	770	96.00
434	30 x 120	372	840	103.50
435	36 x 36	159	460	69.00
436	36 x 48	212	540	75.50
437	36 x 60	265	615	83.00
438	36 x 72	318	690	90.50
439	36 x 84	371	780	100.50
440	36 x 96	424	860	109.00
441	36 x 108	477	940	117.50
442	36 x 120	530	1020	126.00
443	42 x 60	360	740	103.00
444	42 x 72	432	835	112.50
445	42 x 84	504	925	122.00
446	42 x 96	572	1020	132.00
447	42 x 108	644	1120	142.00
448	42 x 120	716	1225	153.00
449	42 x 144	860	1425	175.00

The above list prices include regular tapings.

Handholes ( $3\frac{1}{4}$  x  $4\frac{1}{2}$  in.) \$2.00 each, net. Manhole in shell (11 x 15 in.) \$5.00 each, net. Manhole in head (30 in. or larger, 11 x 15 in.; under 30 in., 9 x 14 in.) \$6.00 each, net. Extra tapings in shell up to and including 2 in., 50 cents each, net. Flanged openings in shell ( $2\frac{1}{2}$  -  $4\frac{1}{2}$  in. inclusive) \$2.50 each, net. Tapings or flanges in head add 50 per cent.

See important information on pages 132 and 133.

# Black Steel Extra-Heavy Storage Tanks

Thickness of shell  $\frac{1}{4}$  in. Heads  $\frac{5}{16}$  in. All seams single riveted

No.	Size Inches	Capacity Gallons	Weight Pounds	List Price
450	18 x 36	40	260	\$ 45.00
451	18 x 48	53	315	50.00
452	18 x 60	66	370	55.00
453	18 x 72	79	420	61.00
454	18 x 84	92	470	66.50
455	18 x 96	106	525	72 00
456	20 x 48	65	350	53 00
457	20 x 60	82	400	58.00
458	20 x 72	98	460	63 00
459	24 x 36	71	350	52.00
460	24 x 42	82	390	54.00
461	24 x 48	94	425	58.50
462	24 x 60	117	495	65.00
463	24 x 72	141	565	71.00
464	24 x 84	164	650	80.00
465	24 x 96	188	720	86 00
466	24 x 108	212	790	92.00
467	24 x 120	235	860	98 00
468	30 x 36	110	460	63 00
469	30 x 48	147	550	70 00
470	30 x 60	184	635	77.00
471	30 x 72	221	720	84.00
472	30 x 84	258	825	95.00
473	30 x 96	294	915	103 00
474	30 x 108	335	1000	111.00
475	30 x 120	372	1090	119.00
476	36 x 36	159	580	77 00
477	36 x 48	212	685	86.00
478	36 x 60	265	790	95.00
479	36 x 72	318	890	104.00
480	36 x 84	371	1010	116 00
481	36 x 96	424	1110	126.00
482	36 x 108	477	1215	136 00
483	36 x 120	530	1325	146.00
484	36 x 144	636	1530	166.00
485	42 x 60	360	950	118.00
486	42 x 72	432	1070	128.50
487	42 x 84	504	1195	139 00
488	42 x 96	572	1315	150.00
489	42 x 108	644	1455	161.00
490	42 x 120	716	1575	172.00

The above list prices include regular tappings.

Handholes ( $3\frac{1}{4}$  x  $4\frac{1}{2}$  in.) \$2.00 each, net. Manholes in shell (11 x 15 in.) \$5.00 each, net. Manholes in head (30 in. or larger, 11 x 15 in.; under 30 in., 9 x 14 in.) \$6.00 each, net. Extra tappings in shell up to and including 2 in., 50 cents each, net. Flanged openings in shell ( $2\frac{1}{2}$  -  $4\frac{1}{2}$  in. inclusive) \$2.50 each, net. Tappings or flanges in head add 50 per cent.

See important information on pages 132 and 133.



# Black Steel Pneumatic Tanks for Domestic Water Supply Systems

Diameter	Length Ft.	Weight	Capacity Gallons	List
24"	6	434	140	\$ 76.00
	8	543	190	88.00
	10	647	235	96.00
30"	6	558	220	94.00
	8	690	295	104.00
	10	819	365	116.00
	12	933	440	130.00
36"	6	699	315	112.00
	8	872	420	126.00
	10	1018	525	142.00
	12	1264	630	156.00
	14	1330	735	175.00
42"	10	1818	720	178.00
	12	1960	865	196.00
	14	2200	1000	218.00
	16	2480	1150	236.00
48"	12	2310	1130	250.00
	14	2600	1300	274.00
	16	2880	1500	304.00
	18	3170	1700	352.00
	20	3450	1880	393.00
	24	4030	2260	438.00
60"	20	5900	2920	647.00
	24	6900	3470	722.00
	30	8300	4400	847.00
	36	9800	5260	947.00
72"	20	7400	4240	790.00
	24	8500	5090	874.00
	30	10200	6360	1020.00
	36	11900	7630	1135.00
84"	20	9200	5760	987.00
	24	10500	6910	1095.00
	30	12400	8645	1275.00
	36	14500	10370	1420.00
	40	15800	11522	1600.00
96"	36	16400	13500	1551.00

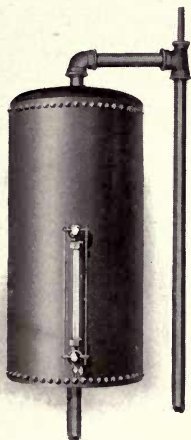
24"-36" dia.	$\frac{3}{16}$ " Shell	$\frac{1}{4}$ " Heads
42" "	$\frac{1}{4}$ " "	$\frac{5}{16}$ " "
48" "	$\frac{1}{4}$ " "	$\frac{3}{8}$ " "
60" "	$\frac{5}{16}$ " "	$\frac{7}{16}$ " "
72"-96" "	$\frac{5}{16}$ " "	$\frac{1}{2}$ " "

Longitudinal seams of above tanks are lap joint double riveted. Tanks 60 inches in diameter and larger have pressed steel manhole in one head. All tanks tapped  $\frac{1}{2}$  inch in concave head for water gauge. Water gauges furnished extra—\$2.00 net.

Tanks of other sizes furnished. Lists on request.

# Galvanized Expansion Tanks

Stock No. 491



These Tanks are made of re-fined galvanized steel tested at 100 pounds pressure, and are good for full rated capacity.

Tanks are riveted and calked.

**T a p p i n g**—These Tanks are tapped top and bottom for 1-inch overflow and expansion pipe, and on side for feed pipe.

Water gauge tappings 12 inches between centers.

List Prices for Tanks and Water Gauges

Style	Size Inches	Capacity Gallons	Square Feet of Radiation	Price of Tank	Price of Gauge
0	10 x 20	8	250	\$ 7.50	\$1.75
1	12 x 20	10	300	8.00	1.75
2	12 x 30	15	500	9.00	1.75
3	14 x 30	20	700	12.50	1.75
4	16 x 30	26	950	14.00	1.75
5	16 x 36	32	1300	15.00	1.75
6	16 x 48	42	2000	16.50	1.75
7	18 x 60	66	3000	31.00	1.75
8	20 x 60	82	5000	37.00	1.75
9	22 x 60	100	6000	51 00	1.75

## Ideal Expansion Tank Bracket

Stock No. 497

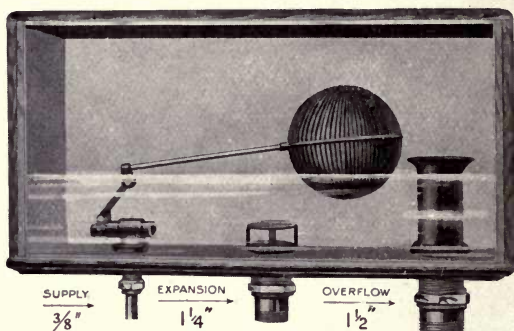


Takes in all sizes of tanks from 10 to 16 inches in diameter. Labor-saving—can be erected in two minutes. A substitute for the old-fashioned shelf, at less expense. Weighs about 5½ pounds and is shipped with screws packed under the slide pieces.

List price each, complete,  
\$1.75

# Ideal Automatic Expansion Tanks

Stock Nos. 492 and 493



The Expansion Tank above illustrated, aside from being ornamental, is absolutely automatic in its operation, insuring always that the system will be full of water. It is a great convenience to the house-owner. There is danger of freezing if the ordinary non-automatic tank is placed in the attic or some out-of-the-way closet. Besides, the customer is often opposed to having an ungainly steel or iron Expansion Tank placed in the bathroom or in a living-room. The IDEAL Tank is made of hardwood, lined with sheet copper, and is finished and varnished to match the woodwork of the room. It does not require altitude gauge nor gauge glass and fittings.

Inside measurements of Tank are: 20 inches long, 9 inches wide, 10 inches deep; and of ample capacity for use on any job of hot-water work to which there is attached 3,000 feet of radiation or less.

## Roughing-in Measurements

2 $\frac{7}{8}$  inches from outside rear edge of tank to center of either overflow or expansion.

5 $\frac{5}{8}$  inches from center of overflow to right side edge of tank.

5 $\frac{5}{8}$  " " " " center of expansion.

3 $\frac{3}{8}$  " " " supply to back edge of tank.

4 $\frac{5}{8}$  " " " " left side edge of tank.

## Price List for Tanks

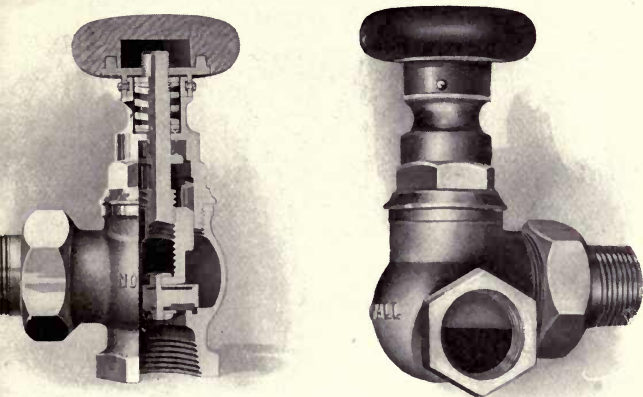
*Including expansion and overflow couplings, with iron pipe thread.*

Style	Stock No.		Price, each
252	492	Square corners, varnished, plain oak .....	\$8.50
262	493	Rounded corners, varnished, plain oak ...	9.00

Upon special order, we can furnish these Tanks in genuine cherry walnut or quarter-sawed oak, at \$1.25 each extra, net.

*Please order by Number and Style.*

# Norwall Packless Radiator Valve



**Angle Valve (With Spring Discs) Corner Valve**

The Norwall Packless Quick-Opening Radiator Valve is a valve of the highest possible grade, embodying the additional features of being self-packed and quick-opening. It will not leak steam, water, or air around the stem of the valve at any time or under any conditions of service.

The stem is non-rising. Tight joint is insured by the use of a special indestructible anti-friction composition disc which is held firmly in place by spring pressure. The handle bears directly on the hub of the valve, and no amount of downward or lateral pressure on the handle can unseat the disc, causing the valve to leak. The stem proper is threaded on its lower end to spirally engage the lower section, the raising or lowering of which opens or closes the valve with less than two full turns of the handle. Between the lower part of the stem and the main disc-holder is placed a special bronze spring disc which compensates the shrinkage of the valve stem as it cools by imparting an elastic instead of a fixed pressure on the seat when the valve is closed. This device insures "quick opening."

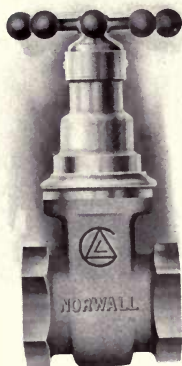
**List Prices of Angle Valve with Union  
Stock No. 301**

Size... ..	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
Rough body { ..	\$3.15	\$3.90	\$4.70	\$6.25	\$8.15	\$13.00
Plated all over { ..						

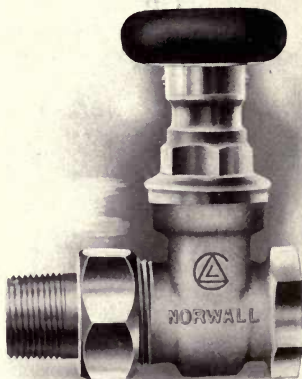
**List Prices of Corner Valve with Union, Offset Pattern  
Right Hand, Stock No. 302. Left Hand, Stock No. 303**

Size.....	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
Rough body { ...	\$3.45	\$4.25	\$5.15	\$6.95	\$8.95	\$14.25
Plated all over { ...						

# Norwall Packless Gate Valve



Stock No. 304



Stock No. 305

Made for high-grade steam- or water-heating work. Requires no packing of any kind at any time and will not leak steam, water, or air around stem of valves.

No matter how heavy or hard the pressure on the handle of this valve the joints cannot be unseated. Inward pressure of steam or water only makes the joints more secure. Ideal for vacuum work.

## Screwed Ends, Right- or Left-Hand Threads

Sizes.....	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
Rough body, finished trimg's.	\$2.25	\$2.75	\$3.65	\$4.95	\$6.00	\$9.25

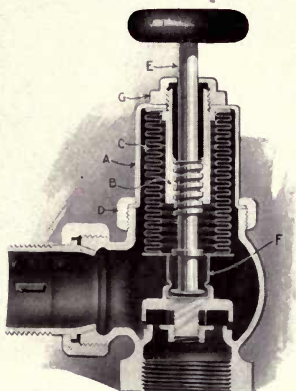
## With Unions

Sizes.....	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
Rough body, plated all over ..	\$3.40	\$4.05	\$5.30	\$6.75	\$8.25	\$11.90



# Sylphon Packless Radiator Valves

Stock No. 345



The Sylphon Packless Radiator Valve is devoid of packing of any kind, and is tightly sealed at every point around the valve stem. Has no sliding or rotating joints. Frictionless in operation and opens and closes easily, as its working parts are not exposed to the steam and wash of the system.

A patented metallic bellows, or Sylphon, is enclosed in the bonnet of the valve, and the valve stem and stem support are located inside the Sylphon. When valve is opened and closed the Sylphon contracts and expands in length without disturbing the steam-tight connection between its upper end and the top of the valve bonnet, and its connection with the Jenkins disc-holder at the bottom of the Sylphon. Thus the valve is hermetically sealed at all points around the stem and will remain so as long as the Sylphon (as indestructible as the valve itself) lasts.

The Sylphon bellows (between the interior of the valve and the valve stem) is made of the best quality of steam brass, and is not affected in any way by heat or corrosion of steam or water. The folds of the Sylphon are sufficiently close to retain the water of condensation and keep out all sediment from lodging in them, so that its action is always free and unobstructed.

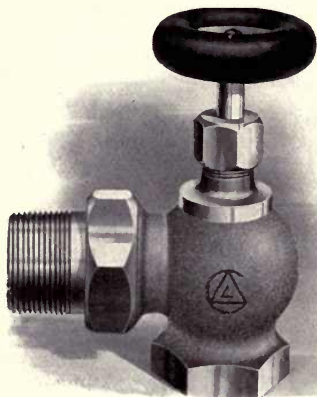
## List Prices

With Union, Jenkins Disc, Rough Body—Plated all over

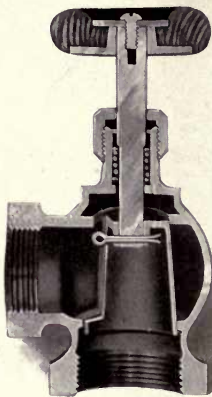
Size .....		$\frac{3}{4}$ in.	1 in.	$1\frac{1}{4}$ in.	$1\frac{1}{2}$ in.	2 in.
Stock No. 345	Angle	\$3.90	\$4.70	6.25	\$8.15	\$13.00
Stock No. 346	Corner	4.25	5.15	6.95	8.95	14.25

When wanted for hot-water heating a hole will be bored through the disc.

# Improved Q. O. Water Radiator Valves



**With Union**  
Threads—Right-Hand on Union  
Right on Bottom



**Without Union**  
Threads—Right on Side  
Right on Bottom

The globular form of the body of this new valve assists in doing away with the sticking on the shell. Only a small portion of the shell comes in contact with the body at the top and bottom, and a narrow vertical strip on either side where a gate is formed for closing the water-way. The tapering shell permits of taking up of any wear which may occur in the valve. The spring in the bonnet or neck of the valve holds the conical shell up to its seat and at the same time exerts a downward pressure on the small rubber washer which is slipped over the stem and held within the chamber in the cap of the valve. The pressure of the spring expands the rubber gasket so as to provide a self-packing feature. The weight is heavy and finish unsurpassed.

## Price List, Bonnetless, with Union

No.	Size, inches .....	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
140	Rough body, finished trim'gs..	\$2.05	2.45	3.25	4.50	6.50	10.00
141	Rough body, plated trim'gs...	2.30	2.60	3.35	4.90	6.65	10.25
*142	Rough body, plated all over...	2.40	2.85	3.65	5.05	7.10	10.85
144	Finished body, plated all over.	2.90	3.40	4.30	5.80	8.10	12.35

## Price List, Without Union

No.	Size .....	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
145	Rough body, finished trim'gs..	1.60	2.25	3.25	4.50	7.00
146	Rough body, plated trim'gs ..	1.85	2.40	3.60	4.85	7.25
147	Rough body, plated all over...	1.95	2.65	3.70	5.00	7.75
149	Finished body, plated all over.	2.50	3.25	4.45	6.00	9.25

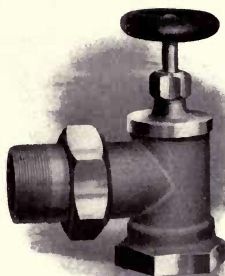
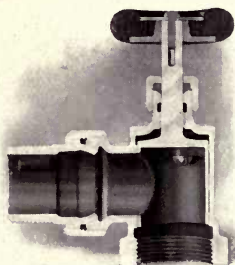
All valves threaded as described, unless otherwise specified.

\*This finish regularly carried in stock. Other finishes can be promptly shipped from factory.

The above Valves and all Radiator Valves can be supplied with Lock and Shield, as illustrated and listed on page 145 of this book.

NOTE.—Measurements of Valves and Elbows, giving distances from centers, for roughing-in, are set forth on page 264.

## Q. O. Bonnetless Water Radiator Valves



No bonnet; body in one piece, saving one screwed joint; waterways full and free.

**Price List, with Union (Threads, R. H. on Union and Bottom)**

No.	Size, inches.....	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
99	Rough body, finished trimmings.....	\$2.05	\$2.45	\$3.25	\$4.50	\$6.50	\$10.00
100	Rough body, plated trimmings.....	2.30	2.60	3.35	4.90	6.65	10.25
*101	Rough body, plated all over.....	2.40	2.85	3.65	5.05	7.10	10.85
103	Finished body, plated all over.....	2.90	3.40	4.30	5.80	8.10	12.35

\*Regularly carried in stock; other finishes can be shipped from factory promptly.

NOTE.—Measurements of Valves and Elbows, giving distances from centers, for roughing-in, are set forth on page 264.



## Screw-Stem Steam Radiator Valves

With Union

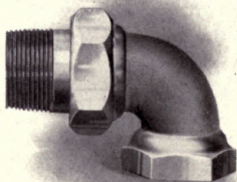
Threads—Right-Hand on Union and Bottom

These Valves are made of best material; metal well distributed; threads carefully cut—a popular valve for steam work.

**Price List for Valve, with Union, and Jenkins Disc**

No.	Size, inches.....	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
70	Rough body, finished trimmings.....	\$3.00	\$3.50	\$4.30	\$5.85	\$7.75	\$12.60
71	Rough body, plated trimmings.....	3.10	3.75	4.65	6.25	8.00	12.85
*72	Rough body, plated all over.....	3.15	3.80	4.75	6.40	8.10	13.10
74	Finished body, plated all over.....	3.65	4.25	5.25	7.00	9.25	14.35
	Jenkins Discs, extra..	.....	.25	.30	.45	.60	90
*62	Brass Disc, rough body, plated all over	2.40	2.85	3.65	5.05	7.10	10.85

# Union Elbows for Water Radiators

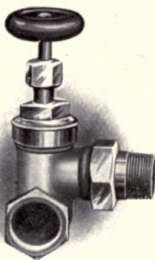


Both Threads Right-Hand  
Price List

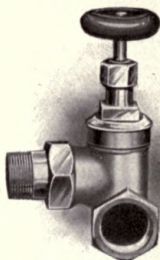
No.	Size, inches.....	½	¾	1	1¼	1½	2
130	Rough body, plain.....	\$1.50	\$1.75	\$2.25	\$2.95	\$3.70	\$6.00
131	Rough body, plt'd trm'gs	1.65	1.90	2.40	3.10	3.85	6.15
*132	Rough body, " all over	1.75	2.00	2.50	3.20	4.00	7.00
134	Finished and " all over	2.25	2.40	3.00	3.90	4.85	8.50

All Ells threaded as above described, unless otherwise ordered.

## Screw-Stem Steam Corner Valves



Right-Hand Valve  
Threaded—Right-Hand on Union  
Right-Hand on Bottom



Left-Hand Valve  
Threaded—Right-Hand on Union  
Right-Hand on Bottom

Price List for Valve, with Union and Jenkins Disc

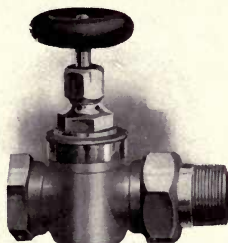
No.	Size, inches.....	½	¾	1	1¼	1½	2
30	Rough body, finished trimmings.....	\$3.15	\$3.85	\$4.75	\$6.45	\$8.55	\$13.85
31	Rough body, plt'd trm'g	3.40	4.15	5.15	6.90	8.80	14.15
*32	Rough body, " all over	3.45	4.20	5.25	7.05	8.95	14.45
34	Finished body " all over	3.90	4.85	6.00	7.80	9.95	15.95
	Jenkins Discs, extra..	.20	.25	.30	.45	.60	.90

All Valves threaded as described, unless otherwise ordered.

\*Regularly carried in stock; other finishes can be shipped from actory promptly.

NOTE.—See page 264 for roughing-in measurements.

# Straightway Q.-O. Water Radiator Valves



**Threads—Right-Hand Both Openings**

This valve can be fully opened or closed by one-quarter turn of handle. It must be connected so that the current of water will move in the direction indicated by the arrow on its side.

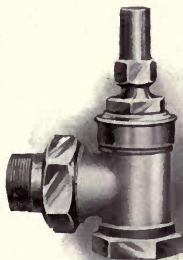
**Price List, with Union**

No.	Size, inches.....	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
114	Rough body, finished trim'gs	\$2.45	\$3.25	\$4.50	\$6.50	\$10.00
115	Rough body, plated trim'gs.	2.60	3.35	4.90	6.65	10.25
*116	Rough body, plated all over	2.85	3.65	5.05	7.10	10.85
118	Finished body, plated all over	3.40	4.30	5.80	8.10	12.35

All Valves threaded as described, unless otherwise ordered.

\*This finish regularly carried in stock; other finishes can be promptly shipped from factory.

## Lock and Shield for Radiator Valves



All styles of Radiator Valves can be furnished, on special order only, with Lock and Shield.

Keys, extra, plain, each.....\$0.25  
 Keys, extra, plated, each......30

NOTE.—When ordering specify number and size of Valve, adding the words "Lock and Shield."

Screw Stem and Corner Valves—One key does for  $\frac{3}{4}$ -inch and 1-inch sizes, another for  $1\frac{1}{4}$ -inch and  $1\frac{1}{2}$ -inch sizes, and a third for 2 inches.

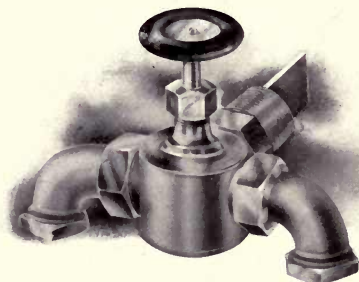
Hot-Water Valves—One key does for  $\frac{3}{4}$ -inch and 1-inch sizes another for  $1\frac{1}{4}$ -inch, and a third for  $1\frac{1}{2}$ -inch and 2-inch sizes.

NOTE.—See page 264 for roughing-in measurements.



# Ideal Unique Water Radiator Valve

Stock No. 380



This Valve provides an interchangeable flow and return connection at one end only of the Hot-Water Radiator, and thus wonderfully simplifies water-heating outfits. Its use saves fitter's labor, elbow, pipe and fittings otherwise necessary in making connection to return end of Radiator. The use of the Ideal Unique Valve also saves the cutting of joists, and extra cutting and boring of floors so objectionable to architects and owners. This Valve permits location of the Radiators in restricted floor space, where it could not go if connected at both ends.

One-sixth of a turn of the handle fully opens or closes the Valve. When the gates are open, all the water is forced to circulate through the Radiator. When the gates are closed, the Radiator is shut off and the water flows through a by-pass in the Valve body, the full area of the pipes. Any Radiator may therefore be shut off without preventing a constant circulation throughout entire system.

As there is only one connection to make when this Valve is used, measurements and "roughing-in" work can be done with absolute accuracy. If necessary at any time to alter size of the Radiator, no repiping is required, no new holes bored, no floors torn up.

The Ideal Unique Valve is made of best materials; all nuts and other parts subject to strain are extra heavy. Both elbows are adjustable so that connections to risers or stubs can be run in any desired direction. A diaphragm extending into the Radiator wholly across the waterway of the first section forces all the water up through the top connections, downward through the other sections, insuring freedom from counter currents and increasing the rapidity of circulation. Thus Radiators yield their highest percentage of efficiency when Ideal Unique Valves are used. Send for special circular containing full description and interior views.

## Data and List Prices

Size, inches.....	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$
Center of body to end of spud.....	$2\frac{7}{8}"$	$2\frac{7}{8}"$	$3\frac{1}{8}"$	$3\frac{5}{8}"$
Inside dimensions of couplings to Radiators..	$1\frac{1}{4}"$	$1\frac{1}{4}"$	$1\frac{1}{2}"$	$1\frac{1}{8}"$
Distance from center top opening of elbows to bottom of elbows.....	$1\frac{7}{8}"$	$1\frac{7}{8}"$	2"	$2\frac{1}{2}"$
Distance between centers of bottom elbow connections.....	$5\frac{1}{2}"$	$5\frac{3}{4}"$	7"	$7\frac{3}{8}"$
Spud diameters.....	$1\frac{1}{4}"$	$1\frac{1}{4}"$	$1\frac{1}{2}"$	2"
List prices.....	\$4.25	\$5.40	\$5.80	\$7.95

# Screw-Stem Brass Globe Valves

Stock No. 178

Extra Heavy for Steam, Water, Oil or Gas



A joint in the cap permits the repacking of stem without leakage.

These Valves are much heavier and much more thoroughly finished than the ordinary Globe Valves.

**Price List for Valve, with Jenkins Disc, Iron Wheel.  
Rough Body—Plain**

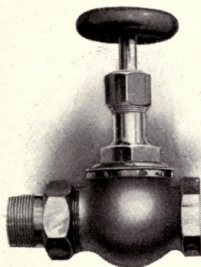
Size, Inches	Price	Size, Inches	Price	Size, Inches	Price
$\frac{1}{8}$	\$1 10	$\frac{1}{2}$	\$1. 60	$1\frac{1}{4}$	\$4.00
$\frac{1}{4}$	1 10	$\frac{3}{4}$	2.20	$1\frac{1}{2}$	5.50
$\frac{3}{8}$	1.25	1	2.80	2	8.00

# Screw-Stem Brass Globe Valves

Stock No. 189

Threads—Right-Hand, Both openings.  
Rough Body—Plated  
all over

**Price List, with Union, Jenkins Disc,  
Wood Wheel**

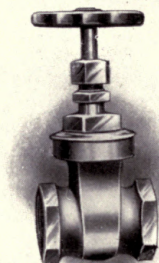


Size, Inches	Price
$\frac{3}{4}$	\$ 3.80
1	4.75
$1\frac{1}{4}$	6.40
$1\frac{1}{2}$	8.10
2	13.10

# I. W. Brass Gate Valve

Stock No. 335

Double Gate, Screwed, without Union



## Price List. Rough Body—Plain

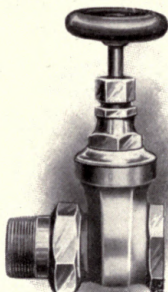
These valves open to the left and have non-rising stems

Size, in.	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$
Price, ea.	\$1.30	\$1.75	\$2.50	\$3.50	\$5.00	\$7.50	\$14.00

# W. W. Brass Gate Valves

Stock No. 373

Double Gate, Screwed, with Union



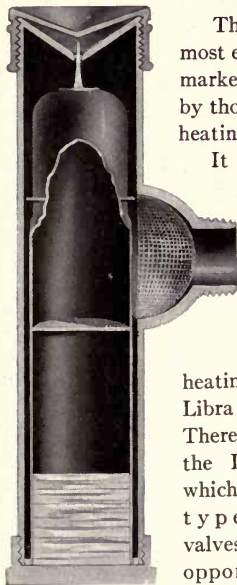
## Price List. Rough Body—Plated all over

Size, inches. . .	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
Price, each . . . .	\$3.10	\$3.75	\$4.65	\$6.10	\$7.85	\$12.10

# Libra Automatic Air Valve

Stock No. 395

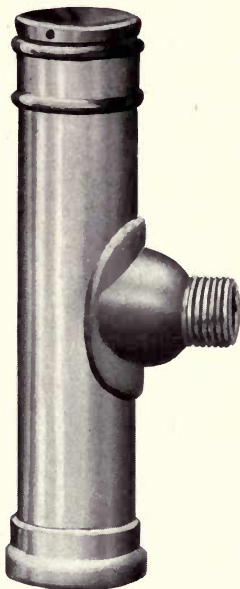
For Venting Steam Radiators



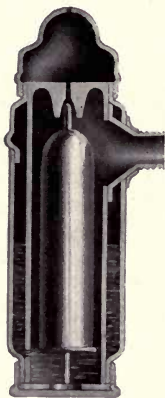
The Libra is one of the simplest and most efficient automatic air valves on the market, which accounts for its adoption by thousands of particular and successful heating contractors.

It depends for its operation solely upon the use of elements contained in heating system, viz.: Air, Heat, and Water. So extremely sensitive is the action of this valve that the air even to the last atom is removed from the Radiator, thereby giving every foot of heating surface its highest efficiency. The Libra is perfectly noiseless in operation. There are no regulating screws used in the Libra, which in other types of valves furnish opportunity for improper

adjustment, resulting in flooding of floors and damaging of decorations. Labor of adjustment is saved. It is equally efficient on the varying ranges of temperature and pressure of Low-Pressure Heating. The valve shell and float are brass; and the pin which seats the valve is of tempered German silver, tapered to a perfect joint. No perishable features. The cap of this valve, which vents on the side, is designed for protection of the seat by preventing the accumulation of dust and other foreign matter. List Price each \$1.00.



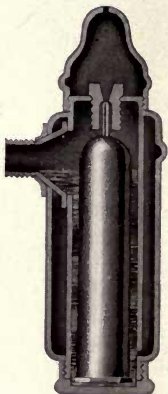
# Norwall and Allen Automatic Air Valves



**Norwall Valve Open**

All Metal  
Non-adjustable  
Expansible Member  
Air

(Patented  
Jan. 29, 1907)



**Allen Valve Closed**

The operation of the Norwall and Allen Valves is exactly the same, the difference in the valves being structural, the Norwall being larger and heavier than the Allen. Each valve consists of a shell with the Radiator connection so placed as to form a well in the lower part of the valve to receive and retain a portion of the condensation after steam reaches the valve. A sealed metal float is placed in this well. An outer or air-chamber surrounds the float well and is connected therewith by a small hole near the bottom.

During the first operation after all the air has been vented, steam passes through the valve for a few minutes till enough condensation has collected to carry the float to its seat and close the valve. When steam reaches the valve, the air in the air-chamber expands. When the valve cools this air contracts, forming a partial vacuum which draws the water from the float-chamber into the air-chamber. The float then drops, opening the valve. Whenever steam again reaches the valve, the air expands and forces the water into the float-chamber, closing the valve. This action is nearly instantaneous, which positively prevents the emission of steam or water from the valve.

Varying steam pressures have no effect on the operation of these valves. Should dirt prevent the proper operation of the valve the valve can be easily cleaned by removing the bottom cap.

## List Price

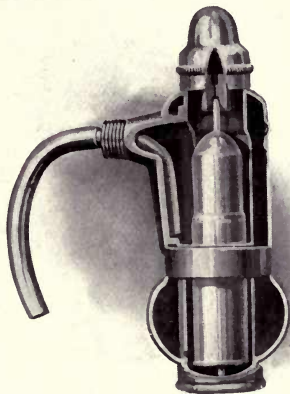
Stock No. 559 Norwall Valve.....	each \$1.30
Stock No. 560 Allen Valve.....	each 1.00



# Norwall Siphon Air Valves

Stock No. 561

This valve is also made entirely of metal, requires no adjustment and cannot be tampered with. The globe bottom enlarges the air chamber and makes this valve more sensitive to the heat changes within the Radiator than the Norwall Air Valve, otherwise the venting operation of the Norwall Siphon Valve is the same as the Norwall Air Valve. For detailed description of the venting operation see paragraph on construction and operation of Norwall and Allen Air Valves.



Patented Jan. 29, 1907.  
Other patents pending

The function of the Siphon is to take care of any sudden charge of water within the Radiator. It frequently happens that a Radiator, while venting "works water" and under this condition the water is liable to surge against the air valve.

The Norwall Siphon Valve, while venting air from the Radiator, instantly closes, and closes tight against water. The valve remains closed as long as water remains against it, but the instant the water in the Radiator falls away from the air valve, the siphon automatically discharges the surplus water in the valve back into the Radiator, and the valve recommences venting. No matter how many times water or steam come to the valve it will instantly close tight against leakage through the valve, but whenever air reaches the valve, it will instantly open.

The Norwall Siphon Air Valve will automatically vent any Radiator of air which can be manually vented by means of a pet cock.

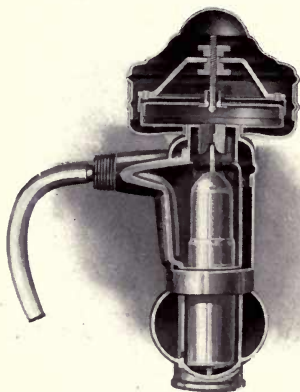
Its operation is entirely automatic, it is made of the best steam metal, and is mechanically perfect.

Should dirt interfere with the perfect operation of the valve, the bottom cap is so fitted that it can be easily removed and the valve cleaned, making it as good as new.

**List Price each \$1.70**

# Norwall Automatic Air and Vacuum Valves

Stock No. 558



## The Highest-Class Air Valve Made

Vents perfectly and automatically keeps the air out after it once gets out.

The Norwall Automatic Air and Vacuum Valve is made entirely of metal. No perishable material is used in any part. Its operation is strictly in accordance with natural and not with mechanical laws. The venting operation of the valve is exactly the same as the Norwall Siphon Air Valve.

The difference between this part of the Vacuum Valve and the Norwall Siphon Valve is structural.

Surmounting the venting valve is the vacuum or air sealing part of the valve which is entirely separate and distinct in its work from the venting part of the valve. The chamber immediately above the valve proper is surrounded by a special bronze diaphragm having a port through its center. Through this port passes a ball-headed pin of smaller diameter than the port. This ball-headed pin is threaded and attached to a yoke by means of two nuts. These nuts permit an easy adjustment of the pin ball under the diaphragm, and also hold the ball in a fixed position. Normally, the diaphragm is slightly suspended on the pin ball, which closes the port. A slight pressure, however, from within the system raises and unseats the diaphragm from the ball and opens the port, permitting the air from the Radiator to pass freely into the atmosphere.

When the float valve in the venting part of the valve closes thermostatically, or when pressure ceases in the Radiator to which the valve is attached the diaphragm drops into contact with the pin ball, thus closing the valve against the return of air to the Radiator through the valve. This diaphragm port is always closed when the float valve is closed or when the pressure within the Radiator is less than  $\frac{1}{2}$  pound.

The Norwall Automatic Air and Vacuum Valve can be used on any Low-Pressure Steam heating apparatus, old or new, and their use, particularly in connection with the Norwall Packless Radiator Valves, insures for the user maximum heating comfort with a minimum fuel expense.

**List Price each \$4.00**

# Sylphon Air Valves

Stock No. 500

The Sylphon, or metallic bellows, has sealed within its flexible walls a liquid which, when subjected to heat, gives off a vapor (like steam from water), the only known substance whose expansion under changes of temperature is invariable. This liquid, although extremely sensitive, never wears out, and never has to be renewed. Its movement and power is ample to close the vent tight, but, as its expansion and contraction is due to vapor pressure within, is yielding after the manner of a pneumatic cushion and will not strain or injure the valve.

The float will close the vent tight when the Radiator and valve are flooded, and hold it so indefinitely.

The constant flow of the water of condensation down the sides of the valve and through the funnel-shaped bottom and tail piece gives a strong siphon action which effectually frees the valve of all sediment.

The vent pin is self-guiding and must come snugly into the vent, which is placed high above the water line of the float, and thus it is impossible for core sand, grease, and other impediments to reach and close this vital part.

Can be furnished with straight shank  $\frac{1}{8}$  inch.

No. 30. Stock No. 500. List Price, \$2.00 each.

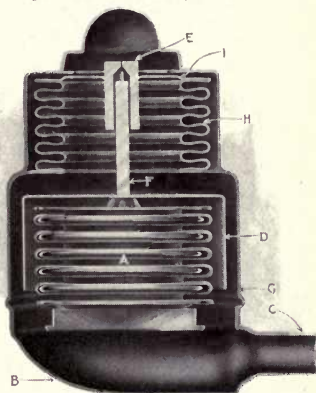
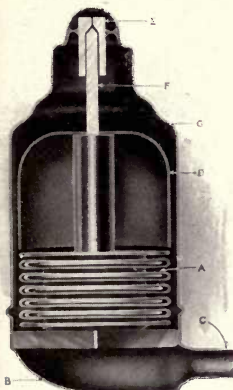
# Sylphon Vacuum and Air Valves

Stock No. 501

With the Sylphon Vacuum Air Valve the vent is normally closed by the upper Sylphon, which is not charged. When steam is raised, its pressure, on reaching a few ounces, raises the upper Sylphon and allows the air to escape from the system. As soon as the steam strikes the lower Sylphon, which is charged with the volatile liquid, it in turn expands and closes the vent. The valve is thus kept closed by the lower, and charged, Sylphon until the pressure of the steam approaches that of the atmosphere, when the upper Sylphon shuts the vent against entrance of air into the system and keeping it closed establishes the vacuum.

Can be furnished with straight shank  $\frac{1}{8}$  inch.

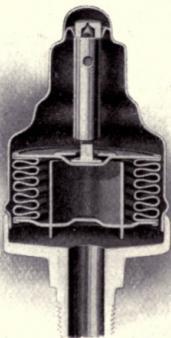
No. 35. Stock No. 501. List Price, \$4.00 each.



# Sylphon Air Valve

Stock No. 527

For Quick Venting



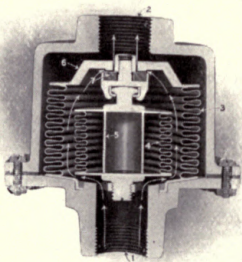
No. 527 Valve

For use on risers, ends of mains, long runs of pipe, indirect stacks, etc., where a large amount of air must be vented quickly. No adjustment. All metal. Very sensitive. Will last indefinitely. Venting port  $\frac{1}{8}$ -inch diameter. Valve connection  $\frac{3}{8}$ -inch pipe thread.

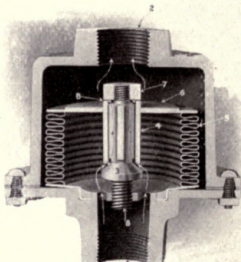
Stock No. 527. List Price \$3.00

## Sylphon Vent Valves

Stock Nos. 525 and 526



No. 525 Valve



No. 526 Valve

For use on two-pipe vapor, vacuum, or atmospheric work. Placed at the end of the returns to vent all the air in the system. One-inch pipe connection at inlet and outlet. No. 525 Valve operates by both pressure and temperature. No. 526 Valve by pressure only. Special catalogue sent on application.

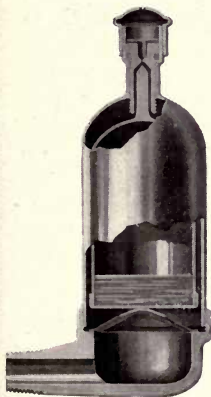
### List Prices

No. 525 Valve .....	\$15.00
No. 526 Valve .....	10.00

# Arco Automatic Air Valve

Stock No. 499

The Arco Automatic Air Valve is designed to meet the demand for a dependable expansion automatic air valve. It is made entirely of the best steam metal, eliminating the objectionable rubber expansion post common to most valves of this class.



In the shell of the valve is a sealed metal float with a flexible bottom. This float is partially filled, under vacuum, with a heat-sensitive liquid which vaporizes at 180 degrees, but is liquid at temperatures below 180 degrees. When cold the valve is open, freely venting the Radiator of accumulated air. When steam reaches the valve the vaporizing of the float liquid expands the flexible bottom in the float, and closes the valve.

When the valve cools below 180 degrees the float vapor condenses and the flexible bottom contracts, thus opening the valve. The sensitiveness of the valve in this respect insures the complete elimination of air from the Radiator to which it is attached.

List Price \$1.00

## Compression Air Valves



List Price per Doz.

Stock No. 520—Old Style, Wood Wheel, Style 3, Nickel Plated..\$3.00

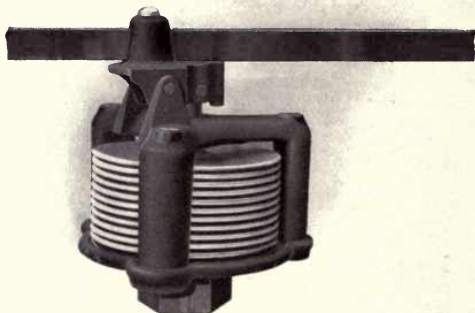
Stock No. 521—Old Style, Key, Style 4, Nickel Plated..... 3.00

Keys, extra, Old Style, 5 cents each, net.



# Ideal Syphon Damper Regulator

For Steam Boilers



(Protected by American and Foreign Patents. U. S. Patents June 2, 1903; June 16, 1903; May 24, 1904; and other applications pending.)

It is composed entirely of metal; is frictionless; is sensitive to the last degree; is positive and invariable in its action, and will not deteriorate with age. The simplicity of its construction will be seen in the engraving.

It works at just about atmospheric pressure, closing the dampers, if desired, before one ounce of steam pressure is generated. Shifting the counterpoise weight changes its application from atmospheric pressure to any pressure desired and maintains good draft control. Its extreme sensitiveness has been thoroughly proven by means of a mercury column which records readings in half ounces.

The regulating device is made upon the bellows plan and is formed of two brass discs with accordion sides, made of steam brass of the best quality. The accordion sides are formed of ten deep folds which permit of ample yet very sensitive expansive effect upon the vertical rod that connects the top of the bellows to the bar upon which the counterbalance weight is placed. The sides are not built up of separate discs, but are formed from a single piece of brass so that there are no joints or seams to come loose and cause leakage. It will last as long as the Boiler.

## Data and Dimensions

The bellows is fed by a 1-inch opening in the bottom plate,  $5\frac{3}{4}$  inches in diameter;  $2\frac{1}{4}$  inches high at rest. The lever is 37 inches long. The lever weight weighs  $5\frac{1}{2}$  pounds. The complete regulator weighs 15 pounds, including all trimmings; shipping weight, boxed, 22 pounds.

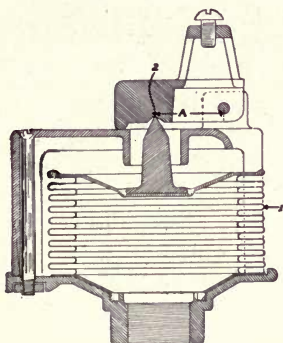
This regulator is shipped complete as illustrated, and with 12 feet of No. 0 steel plumbers' chain, four S hooks, and two ceiling pulleys.

No. 22. List Price, each, \$20.00

# Ideal Sylphon Vapor Regulator

No. 924

For Damper Regulation on Vapor Heating



This regulator is specially designed for vapor heating and all steam work where very low pressures are used. It is extremely sensitive and by means of double balancing weights can be adjusted to operate, if desired, exactly at atmosphere or any pressure up to 3 pounds. Tests show that it will operate under pressures which must be measured in ounces.

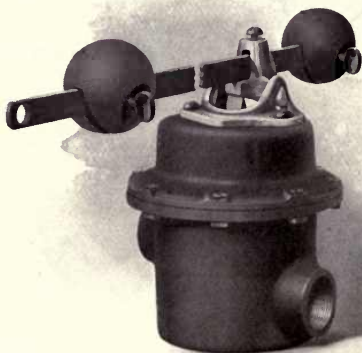
Made similarly to our No. 22, but with a bellows larger in diameter and of thinner metal. The distance "A" between rocker pivots is longer than in the No. 22. These features give extreme sensitiveness without impairing durability. Point "2" is a knife-edge bearing.

Made with 1-inch pipe connection and shipped complete with lever, two weights, four S hooks, 12 feet of chain, and two ceiling pulleys.

List Price \$25.00

# Ideal Sylphon Damper Regulator

For Water Boilers and Tank Heaters



(Protected by American and Foreign Patents. U. S. Patents June 2, 1903; June 16, 1903; May 24, 1904. and other applications pending.)

This Regulator is placed on the boiler or heater and automatically adjusts the dampers according to changes in water temperature. The water circulates in the regulator around an inner shell containing a volatile fluid. As the temperature increases the fluid expands a Sylphon bellows, tilting the lever and moving the dampers. This operation is reversed as the water cools. Weights are set to maintain different temperatures. There is no rubber diaphragm or other perishable material. Extremely sensitive and durable.

Regulators Nos. 42, 43, and 44 are all similar in construction, the only change being in the chemicals necessary to regulate heater according to temperature, running from 120 to 240 degrees.

## Data and Dimensions

					Degrees
No. 42 Regulator,	for water temperatures running	120	to	180	
No. 43	" " "	"	"	"	160 " 220
No. 44	" " "	"	"	"	190 " 240

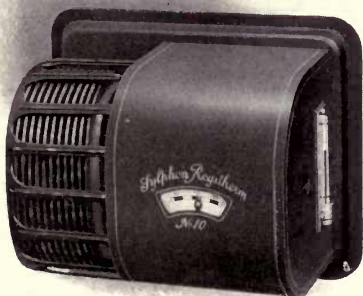
Height, 7 inches; diameter, 5 inches; weight, complete with lever and counterpoises, 28 pounds; shipping weight, boxed, 35 pounds. The Regulator is furnished complete, with 12 feet of plumber's chain, 4 S hooks, and two ceiling pulleys.

List Price, each, \$25.00

NOTE.—When the flow main from the Water Boiler is larger than  $1\frac{1}{4}$  inch, the Regulator is installed by connecting it between the flow and return mains with  $1\frac{1}{4}$ -inch pipings. When the flow main is  $1\frac{1}{4}$  inch or less (frequently the case with Tank Heaters), the Regulator is simply connected direct to the flow pipe.

# The Ideal Sylphon Regitherm

Stock No. 600



**A Self-Contained Regulator, Automatically Controlling the Temperature at any Desired Point between 60 and 80 Degrees Fahrenheit.**

A new automatic temperature regulator which operates in response to the slightest change in temperature. It requires no outside agencies, such as electricity, compressed air, or clock-work to help it perform its functions, but exerts sufficient force within itself to adjust the heating apparatus, either increasing or decreasing the supply of heat. Its range of control is from 60 to 80 degrees Fahrenheit, and it can be set at any desired point within these limits. The fuel saved by this regulator will pay its cost in one or two seasons.

The operation is based on the same principles that govern a thermometer—i. e., the action of heat or cold on a volatile chemical. In the Regitherm is a metal bellows capable of expanding and contracting like a telescope. Within this bellows is sealed, air-tight, a small amount of the volatile liquid. The slightest variation of temperature changes the form of the liquid (expanding by vaporizing, contracting by condensation), hence changes the outward pressure exerted by it. This pressure moves the bellows.

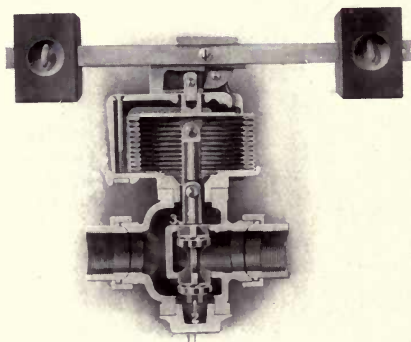
The area of the end wall of the bellows is 30 square inches, so a change of 1 degree in temperature (developing  $\frac{1}{2}$  pound per square inch) creates a force of 15 pounds within the Regitherm. This force expands the bellows  $\frac{1}{2}$  inch and operates a short lever arm attached to a small wire cable, which leads to a balanced lever controlling the dampers of the heater. By this transmission the movement of  $\frac{1}{2}$  inch at the Regitherm is magnified eight-fold at the dampers, giving a wide range of action upon the heater.

Size of instrument (not including mounting board)  $8\frac{3}{4}$  inches wide,  $7\frac{3}{4}$  inches high,  $5\frac{3}{4}$  inches deep. Shipping weight, 50 pounds. Style No. 10, List Price each.....\$35.00

Send for Booklet

# Ideal Sylphon Reducing Valve

For Steam Pressure



This valve will reduce steam pressure from any initial pressure to any pressure under 15 pounds, either above atmosphere or in vacuum, and maintain it steadily with less variation than any other reducing valve made. Its extreme sensitiveness makes it possible to reduce pressure to fractions of 1 pound. Particularly well adapted for use on Central Heating Systems with the Ideal Sylphon Regitherm for room temperature control; and to reduce street steam pressure for use on vapor work, it will give the best results.

## List Prices

Size Inches		Shipping Weight Lbs.	Price
$\frac{1}{2}$	Bronze Body*	45	\$25.00
$\frac{3}{4}$	" "	48	25.00
1	" "	50	28.00
$1\frac{1}{4}$	" "	52	33.00
$1\frac{1}{2}$	" "	55	35.00
2	Iron Body*	95	44.00
$2\frac{1}{2}$	" "	135	57.00
3	" "	165	72.00
$3\frac{1}{2}$	" "	220	85.00
4	" "	280	100.00

Shipped complete with lever, bar, and weights.

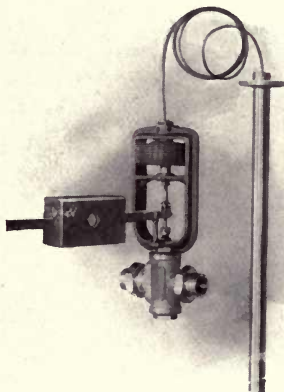
\*Sizes  $\frac{1}{2}$  inch to  $1\frac{1}{2}$  inches inclusive are all bronze and are furnished with unions on both sides. Sizes 2,  $2\frac{1}{2}$ , and 3 inches are iron body with all interior parts bronze, including the seats, which are removable, and are furnished with screwed ends. Sizes above 3 inches are iron body, with all interior parts of bronze, including the seats, which are removable, and are flanged extra heavy standard, but without companion flanges. Companion flanges furnished at extra cost, price on application. When flanges are ordered drilled, and no lay-out is given, manufacturer's extra heavy drilling is used.

NOTE.—Where the initial pressure is more than 25 pounds, it is necessary to place a Pop Safety Valve on the low-pressure side set at 25 pounds. This prevents damage to the bellows in case high pressure should accidentally be admitted to the low-pressure side.



# Ideal Sylphon Tank Regulator

Stock No. 930



For the automatic regulation of water temperature in storage tanks where heated by steam. The extreme sensitiveness, positive action, and simplicity of this regulator have placed it in a class by itself, and made it applicable in hundreds of ways. It can be used in hotels, office buildings, schools, public institutions, factories of all kinds, breweries, bottling works, aquariums, canning factories, sugar refineries, chemical laboratories, laundries, on railroad water-tanks, sprinkler systems, feed water heaters, pasteurizing machines, vulcanizing machines, suction gas producers, etc.

This regulator employs the Sylphon principle, consisting of an expanding and contracting accordion-like bellows, made entirely of brass. The expansion of a volatile liquid contained in this bellows and operating by the changes in water temperature is the sole motive power. No compressed air, electricity, or auxiliary machines necessary. Contains no perishable diaphragm and will last indefinitely.

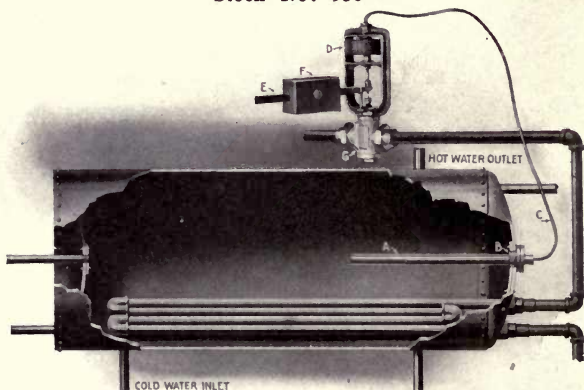
The valve is of the highest grade, balance type, and can be used on any steam pressure.

Union connection on both sides make installation easy.

Send for Special Catalogue. See next page for further description.

# Ideal Sylphon Tank Regulator

Stock No. 930



The brass stem "A" screws directly into the storage tank through a  $1\frac{1}{4}$ -inch opening "B" in either the end or the side of the storage tank. A brass tube "C,"  $\frac{3}{8}$ -inch outside diameter and 8 feet long, connects stem "A" with the metal bellows.

Stem "A," tube "C," and bellows "D" are hermetically sealed, and contain a liquid which vaporizes at low temperatures. When the water in the tank becomes heated, vapor generated in stem "A" forces some of the liquid through pipe "C" into bellows "D," which expands the latter by overcoming counterpoise weight "F" and closes valve "G." When the water in the tank cools slightly, some of the vapor in stem "A" condenses, relieving the pressure and allowing the bellows to collapse and open valve "G." By adjusting the weight "F" the regulator will operate at any desired temperature between 140 and 200 degrees Fahrenheit.

Installed by screwing stem "A" into tank and inserting valve "G" in steam line. Bellows and stem are charged and sealed at the factory.

Sizes  $\frac{1}{2}$  inch to  $1\frac{1}{2}$  inches inclusive are all bronze, and are furnished with unions on both sides. Sizes 2,  $2\frac{1}{2}$ , and 3 inches are iron body with all interior parts bronze, including the seats, which are removable, and are furnished with screwed ends. Sizes above 3 inches are iron body, with all interior parts of bronze, including the seats, which are removable, and are flanged extra-heavy standard, but without companion flanges. Companion flanges furnished at extra cost: price on application. When flanges are ordered drilled, and no layout is given, manufacturer's extra-heavy drilling is used.

In ordering give only size of pipe in steam coil. Shipped complete with stem, tube, bellows, weight, lever, and valve.

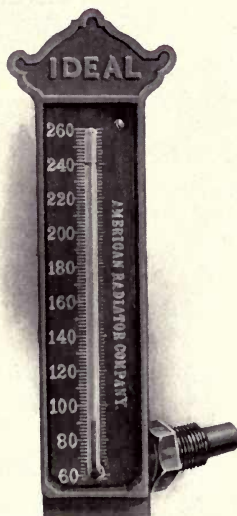
Size, Inches	Shipping Weight, lbs.	List Price	Size Inches	Shipping Weight, lbs.	List Price
1	60	\$ 70.00	4	290	\$120.00
$1\frac{1}{4}$	65	75 00	5	375	260.00
$1\frac{1}{2}$	68	80.00	6	525	350.00
2	110	90 00	8	875	480.00
$2\frac{1}{2}$	150	95.00	10	1425	600.00
3	175	100.00	12	2150	880.00

# Ideal Hot-Water Thermometers

Separable Mercury Bath



Straight



Angle

No Hot-Water Boiler should be without an IDEAL Hot-Water Thermometer.

The glass bulb of each instrument is immersed in a Mercury bath, protected by a thin steel tube, so there is little chance of injury.

Stem should be fully immersed in, or subject to a continuous circulation of the hot water, to secure accurate reading.

If thermometer does not face in right direction when screwed up tight, loosen small screw slightly and (without lifting) turn top of frame to desired position, after which tighten small screw.

Each thermometer is sent out carefully packed in a separate wooden box.

Non-boiling colored liquid furnished at same price if desired.

Name on scale free of charge where thermometers are ordered in lots of 12.

	List Price Each
Stock No. 540 Hot-Water Thermometer, straight.....	\$5.00
Stock No. 541 Hot-Water Thermometer, angle, (for use on risers, or circulating pipe) .....	6.00

## Ideal Steam Gauges

Stock No. 577

With Bourdon Spring



Size  $4\frac{1}{2}$  inches, iron case without back flange; nickel plated rim; silvered dial; without cock. Registering 30 pounds pressure.

In all respects as regularly supplied on IDEAL Steam Boilers.

These gauges are all equipped with hair-spring tension, so the movement is rendered very sensitive at the lowest pressures under which house-heating

boilers are usually operated—viz., 2 pounds or less. We can also supply high-pressure gauges (prices on application.)

List Price each \$8.20. (Note.)

## Ideal Altitude Gauges

Stock No. 578

These gauges will indicate accurately, at the boiler, the height of water in the system, and will be found very useful instruments.

EXPLANATION: When the water is at its proper level in expansion tank, remove the ring and glass, and set the stationary hand at the pressure indicated by the working hand; whenever the pressure falls below this point, water should be added. Size:  $4\frac{1}{2}$  inches; iron case with nickel-plated rim; no cock. List Price each \$12.20. (Note.)



## Norwall Pressure and Vacuum Gauges

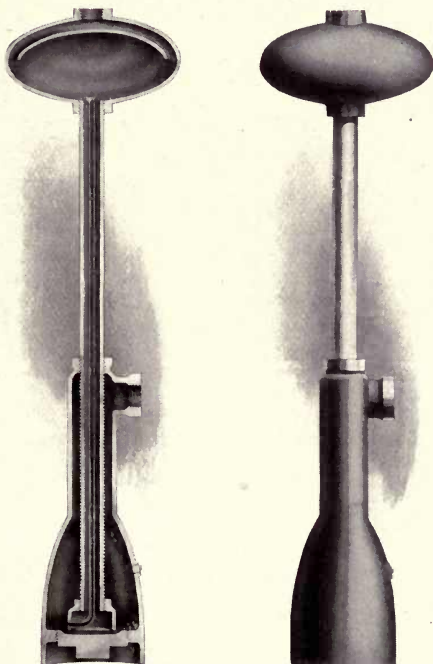
Stock No. 587

These are same size and general construction as our Steam Gauge. They indicate to 30 lbs. pressure and 30 inches vacuum. List price each \$12.20. (Note.)

NOTE.—Name on the dial of all the above gauges free of charge when ordered in lots of 25.

# Honeywell Heat Generators

For Hot-Water Heating Outfits



These Generators are designed to meet the demand for a device to quicken the circulation in hot-water heating jobs. When connected to the piping of an ordinary gravity plant this Generator seals the circuit and permits the generation of a slight pressure up to 10 pounds, at which point it relieves itself through the operation of a mercury seal, eliminating the element of danger. The tendencies of this slight pressure are: First, to increase the circulation; second, to widen the range of temperatures to a point equal to that of steam; third, to accomplish an economy in fuel.

The pressure created by this Generator is calculated to force the water through any part of a defective piping system where the circulation is sluggish under ordinary gravity conditions. It is simple to install and is applicable to both old and new heating plants.

Sectional outline view herewith shows mercury seal, connections to system, equalizing pipe and deflecting plate.

Quantity of mercury necessary for successful operation, style 1, 3½ pounds; style 2, 6½ pounds; style 3, 10 pounds.

Approximate weights: style 1, 35 pounds; style 2, 45 pounds; style 3, 55 pounds.

## List Prices, Each

Style 1 (Stock No. 537) for 1,200 square feet .....	\$25.00
Style 2 (Stock No. 538) for 2,500 square feet .....	35.00
Style 3 (Stock No. 539) for 3,500 square feet .....	50.00
Style 4 (Stock No. 536) for 10,000 square feet .....	65.00



## Ideal Expansion Plinth Blocks



**Single-Opening Plinth Block,**  
providing for one line of pipe



**Double-Opening Plinth Block,**  
(for Return). Right-Hand Block

IDEAL Expansion Plinth Blocks overcome trouble due to expansion and contraction of riser pipes, and make a perfect finish where pipes come through base-boards, wainscoting, walls, etc.—whether they are marble, cement, or wood. They save the heating contractor time, worry, and money, and the necessity of having a man constantly on hand to see that a space is left either above or below the pipe, as the case may be, to allow the proper clearance for expansion and contraction.

With these blocks the hole for the pipe connection with the riser is completely covered by the movable or sliding plate. The device is small and compact, 10 inches high and 4 inches wide, made of smooth-finished cast iron, and can be decorated to correspond to the adjoining wall. Made for any size pipe from  $\frac{3}{4}$  inch to 2 inches. Can be permanently secured in place against woodwork, plaster, and tiling, while jobs are being roughed in. The Plinth Block being  $1\frac{1}{4}$  inches deep, the finish is flush (or nearly so) with the base-board, which, when nailed in place, covers the projecting flange of the block. The sliding plate always tightly fits the riser, and does not leave the slightest opening.

On special order we can furnish Plinth Blocks of the following size: 8 inches high,  $5\frac{3}{8}$  inches wide,  $1\frac{1}{4}$  inches deep, double-opening only. Pipe sizes, supply  $\frac{1}{2}$  inch to 2 inches; return  $\frac{3}{8}$  inch to  $1\frac{1}{2}$  inches.

Orders for Double-Opening Blocks should specify whether for right-hand or left-hand return.

### List Price

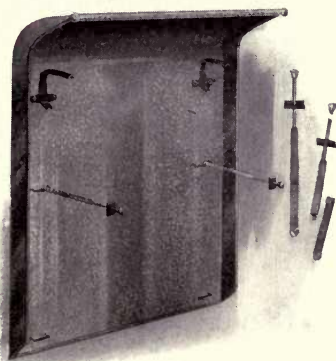
Single-Opening Block, Stock No. 904.....	\$1.00 each
Double-Opening Block, Stock No. 905.....	\$1.00 each

# Ideal Radiator Shields

Stock No. 906

Either style of IDEAL Shields is well adapted to low window Radiators over which curtains are hung, especially in houses located in cities in which soft coal is most largely used, and the atmosphere thereby made full of soot.

Can be readily fitted to Radiators of all varying constructions, as the brackets can be quickly shifted to connect with any make of Radiator. They do not interfere with the operation of the Radiator valves or air valves, side piece being only 2 inches wide.

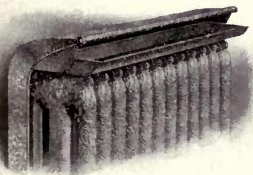


Regular Pattern

## List Prices for Regular Pattern

Height of Radiator Inches	26 or lower 5 Sec. or less	32 & 38 5 Sec. or less	44 5 Sec. or less	
Shields from Black Sheets.....	\$3.00	\$3.20	\$3.40	Radiators larger than 5 sec. add 10c for each additional section.
Shields from Galvanized Sheets	3.60	3.80	4.00	Radiators larger than 5 sec. add 12c for each additional section.
Brass, having Gal- vanized Iron Backs	17.00	17.40	17.60	Radiators larger than 5 sec. add 30c for each additional section.
All Brass .....	18.00	19.00	19.60	Radiators larger than 5 sec. add 60c for each additional section.
Black, painted or bronz'd, plain colors	4.00	4.20	4.40	Radiators larger than 5 sec. add 30c for each additional section.
Galv., painted, or bronz'd, plain colors	4.60	4.80	5.00	Radiators larger than 5 sec. add 32c for each additional section.

Add \$2.00 to above List Prices for Vapor Pan.



Vapor-Pan Attachment (showing  
Pan Withdrawn)

Shields painted to order or to match decorations at extra charge.

In ordering indicate—(1) if Steam or Water Pattern; (2) style of Radiator and height; (3) number and length of sections.

Orders not Subject to  
Cancellation

## B. and C. Floor and Ceiling Plates



Floor Plate



Ceiling Plate

These Adjustable Hinged Plates can be put on after work is finished by slipping plate around pipe, the ceiling plate being fastened to pipe by means of screw, and the floor plate firmly held by a simple, cleverly contrived spring.



The Combination Floor and Ceiling Plate here shown may be used for either floor or ceiling by adjusting the screw in the collar.

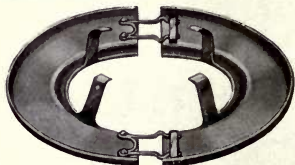
### Price List

Size, inches .....	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3
<b>Floor and Ceiling</b>								
Stock No. 702 Black, each.....	.14	.14	.18	.20	.24	.28	.43	.60
Stock No. 703 Nickel, each.....	.25	.25	.28	.32	.35	.38	.52	.75
<b>Combination</b>								
Stock No. 710 Black, each.....	.14	.14	.18	.20	.24	.28	.43	.60
Stock No. 711 Nickel, each.....	.25	.25	.28	.32	.35	.38	.52	.75

## Imperial Floor and Ceiling Plates

Stock No. 704

Adjustable, Made of Spring Brass and Nickel Plated



Easily adjusted to the pipe and will stay firmly in position. Will always hold the nickel.

Size, inches .....	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$
Nickel, each.....	.25	.25	.28	.32	.35	.38	.52

# Ideal Bronze, Liquids and Primer



After many years of experiment and experience we have at last been successful in obtaining a grade of bronze powder exactly suited to the decorating of AMERICAN Radiators. It lusters like loosened gold. The bronze is our own direct importation, and a single trial will convince you of the exceptional brilliancy and durability of its luster, and the very large amount of surface per pound it will cover.

We earnestly believe that the use of a superior quality of bronze in the decorative treatment of Radiators adds greatly to the popularity of heating apparatus among home-lovers.

Bronze Powder is put up in screw-top cans containing one pound. Aluminum is also put up in one-half pound cans. Gold Bronze, Stock No. 652. Copper and Silver Bronze, Stock No. 653. Aluminum Bronze, Stock No. 654. Color Bronze, Stock No. 655.

No. 646 Ideal Bronzing Liquid; and Ideal Bronze Primer No. 651 in gallon, half-gallon, quart, and pint patented stopper cans.

## Directions for Use

**Bronze**—Use Ideal Bronze Primer for all colors. Do not attempt to bronze any surface without first applying a coat of primer. Mix bronze into as much liquid as you will use immediately, sufficient to make it about the consistency of cream. Apply with a fitch brush (bear hair)—do not work it any more than necessary with the brush—cover surface, if possible, with one stroke of brush. Applying bronze when radiators are warm improves the luster.

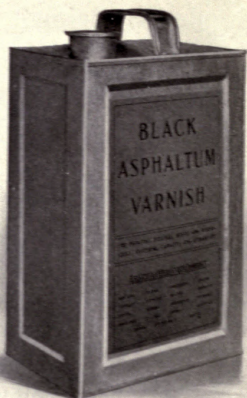
**Liquid**—Keep the liquid can closed tight when not in use. Liquid left uncorked a very short time evaporates and thickens, and becomes worthless. Do not get any bronze in liquid-can, as the smallest particle will turn it green. Liquid, if properly used, will not have to be thinned. Do not use a dirty mixing pot or brush, and see that all dried-up bronze is carefully removed before mixing fresh. One pound of bronze (except aluminum) will cover about 300 square feet of radiation; one pound of aluminum powder will cover about 600 square feet of radiation. One quart of liquid is required for each pound of bronze powder, except in the case of aluminum, for which the proportion is about one gallon of liquid to one pound of the powder.

## Black Asphaltum

Stock No. 647

For the painting of boilers and risers, we offer a Black Asphaltum of great covering capacity and durability, put up in one-gallon and half-gallon cans and in barrels of 30 gallons.

First-class covering in every respect. Gives A-1 satisfaction to all who use this kind of varnish.



## Ideal Maroon Gloss Japan

Stock No. 648

We also offer an excellent quality of these goods in gallon, half-gallon, quart, and pint cans. This Japan has been thoroughly tested and proven to be first class in every regard.



### Directions for Use

This Maroon Gloss Japan settles in a very short time. Is easily stirred if liquid is poured off and the pigment loosened with a putty knife, then gradually adding the liquid again. The more thoroughly the liquid is stirred the better will be the result. Thin with turpentine and apply with ordinary flat bristle varnish

brush. One coat is sufficient for Radiator work. No priming is required; has high gloss, quite equal to Enamel.



# Ideal Radiator Enamels

Stock No. 650

Send for Color Card



To artistically, yet simply, decorate the heating apparatus is frequently a most effective advertisement for the contractor.

We invite attention to our line of clear, rich-hued IDEAL Radiator Enamels (send for sample tint card). The tints offered are delicate yet bright, and by mixing one color with another almost any fashionable shade may be secured to harmonize with the draperies, wall paper, or other furnishing of artistic homes. The Enamels are made after our own formula, and we highly recommend them for covering quality and durability.

Colors regularly carried in stock in gallon, half-gallon, and quart cans are:—

Alabaster,	Vermilion,	Silver Gray,	Terra Cotta,
Oak Brown,	Ebony (or Black),	Medium Blue,	Bronze Green,
Gobelin,	Apple Green,	Cream,	Sea Green,
	Maroon,		Nile Green

Gloss finish is regularly carried by us in stock except Ebony, which we supply in Flat finish only. Flat finish in other than Ebony color is supplied only on special order.

## Directions for Use

**Enamels**—Radiators should be painted with one coat of IDEAL Enamel Primer and one or two coats of Enamel. Stir enamel thoroughly and apply with an ordinary flat bristle varnish brush. If it thickens add a little turpentine—too much will kill the luster. Be sure to remove all oil or grease from surface of Radiator before applying, or enamel will peel off. Do not flow it on too heavily—two thin coats are far better than one thick. One gallon will cover about 250 square feet of surface. Caution—Enamel should be applied when Radiator is cold, and heat should not be turned on for at least twenty-four hours thereafter.

## Ideal Bronze and Enamel Primer

Stock No. 651

Our specially prepared Primer should be used to secure best results. It is especially valuable for use as the first coat before applying enamel. It acts as a filler and furnishes a smooth surface upon which to apply the finishing coat. Supplied in same size cans as Enamel.

# Frazer's Non-Corrosive Pipe Joint Paste

Stock No. 662

Frazer's Pipe Joint Paste has been adopted by us only after thorough investigation. It contains a large percentage of mica and is far better for the requirements of steam, water, and gas fitting, and is cheaper than white or red lead. The latter soon harden and make it extremely difficult to remove or disconnect a fitting which has been in place for a length of time.



Where Frazer's Pipe Joint Paste is used a fitting may be removed with ease after years of service.

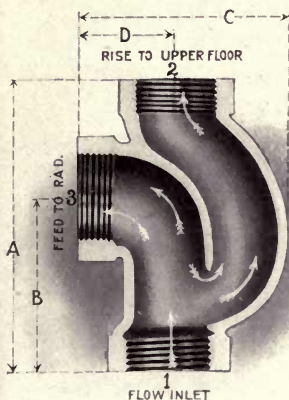
Frazer's Pipe Joint Paste retains its pasty form indefinitely; it resists heat and cold, acids, and alkalis, and by its use absolutely air-tight joints may be made.

Put up in 5-, 10-, and 25-pound cans; also half-barrels and barrels.

## Miscellaneous Specialties

We are in position to promptly fill orders for Brass Check Valves, Imperial and Russell Automatic Air Valves, Improved Compression Air Valves, Powers Regulators, Russell and Ajax Floor and Ceiling Plates, Nason Steam Traps, Registers, Marble Radiator Tops, Iron Cement, etc.

# O. S. Distributors



Positions of tappings are indicated by figures 1, 2, 3.

## Price List and Dimensions

Stock No.	Tappings, inches			Dimensions, inches				List Price Each
	1	2	3	A	B	C	D	
605	$\frac{3}{4}$ x $\frac{1}{2}$ x $\frac{1}{2}$			$2\frac{3}{4}$	$1\frac{1}{2}$	$2\frac{1}{4}$	$1\frac{1}{4}$	\$0.50
606	$\frac{3}{4}$ x $\frac{3}{4}$ x $\frac{1}{2}$			$2\frac{1}{8}$	$1\frac{3}{8}$	$2\frac{1}{8}$	$1\frac{3}{8}$	.50
607	$\frac{3}{4}$ x $\frac{1}{2}$ x $\frac{3}{4}$			$2\frac{1}{8}$	$1\frac{1}{2}$	$2\frac{1}{8}$	$1\frac{1}{4}$	.50
608	1 x $\frac{1}{2}$ x $\frac{3}{4}$			$3\frac{3}{8}$	2	$2\frac{1}{8}$	$1\frac{3}{8}$	.60
609	1 x $\frac{3}{4}$ x $\frac{1}{2}$			$3\frac{3}{8}$	2	$2\frac{3}{8}$	$1\frac{5}{8}$	.60
610	1 x $\frac{3}{4}$ x $\frac{3}{4}$			$3\frac{5}{8}$	2	$2\frac{3}{4}$	$1\frac{3}{8}$	.60
611	1 x $\frac{3}{4}$ x 1			$3\frac{3}{4}$	2	$2\frac{3}{4}$	$1\frac{1}{2}$	.60
612	1 x 1 x $\frac{3}{4}$			$3\frac{3}{4}$	2	$2\frac{3}{4}$	$1\frac{3}{8}$	.60
613	1 x 1 x 1			4	$2\frac{1}{4}$	3	$1\frac{1}{2}$	.60
614	$1\frac{1}{4}$ x 1 x 1			$4\frac{3}{8}$	$2\frac{3}{8}$	$3\frac{5}{8}$	2	.80
615	$1\frac{1}{4}$ x 1 x $1\frac{1}{4}$			$4\frac{1}{2}$	$2\frac{1}{2}$	$3\frac{3}{4}$	2	.80
616	$1\frac{1}{4}$ x $1\frac{1}{4}$ x 1			$4\frac{3}{8}$	$2\frac{3}{8}$	$3\frac{1}{2}$	2	.80
617	$1\frac{1}{4}$ x $1\frac{1}{4}$ x $1\frac{1}{4}$			5	$2\frac{3}{4}$	$3\frac{7}{8}$	2	.80
618	$1\frac{1}{2}$ x $1\frac{1}{4}$ x 1			$4\frac{1}{2}$	$2\frac{3}{8}$	$3\frac{3}{4}$	$1\frac{7}{8}$	.90
619	$1\frac{1}{2}$ x 1 x $1\frac{1}{4}$			$4\frac{3}{4}$	$2\frac{5}{8}$	4	$2\frac{1}{4}$	.90
620	$1\frac{1}{2}$ x $1\frac{1}{4}$ x $1\frac{1}{4}$			$4\frac{5}{8}$	$2\frac{3}{8}$	4	$2\frac{1}{4}$	.90
621	$1\frac{1}{2}$ x $1\frac{1}{4}$ x $1\frac{1}{2}$			$4\frac{3}{4}$	$2\frac{1}{2}$	$3\frac{7}{8}$	2	.90
622	$1\frac{1}{2}$ x $1\frac{1}{2}$ x $1\frac{1}{4}$			$4\frac{3}{4}$	$2\frac{1}{2}$	$3\frac{3}{4}$	$1\frac{7}{8}$	.90
623	$1\frac{1}{2}$ x $1\frac{1}{2}$ x $1\frac{1}{2}$			$5\frac{1}{8}$	$2\frac{3}{4}$	$4\frac{1}{4}$	$2\frac{1}{4}$	.90
624	2 x $1\frac{1}{4}$ x $1\frac{1}{2}$			$4\frac{3}{4}$	$2\frac{1}{8}$	$4\frac{1}{4}$	$2\frac{1}{4}$	1.20
625	2 x $1\frac{1}{2}$ x $1\frac{1}{4}$			$4\frac{3}{4}$	$2\frac{1}{8}$	$4\frac{3}{8}$	$2\frac{1}{4}$	1.20
626	2 x $1\frac{1}{2}$ x $1\frac{1}{2}$			5	$2\frac{1}{8}$	$4\frac{1}{2}$	$2\frac{1}{4}$	1.20
627	2 x 2 x $1\frac{1}{4}$			$4\frac{7}{8}$	$2\frac{1}{2}$	$4\frac{1}{2}$	$2\frac{1}{4}$	1.20
628	2 x 2 x $1\frac{1}{2}$			$5\frac{1}{4}$	$2\frac{1}{8}$	$4\frac{1}{2}$	$2\frac{1}{4}$	1.20
629	2 x 2 x 2			$5\frac{5}{8}$	$2\frac{7}{8}$	$4\frac{3}{4}$	$2\frac{3}{8}$	1.20
630	$2\frac{1}{2}$ x $1\frac{1}{2}$ x $1\frac{1}{2}$			$5\frac{1}{4}$	$2\frac{7}{8}$	$4\frac{7}{8}$	$2\frac{1}{2}$	2.00
631	$2\frac{1}{2}$ x 2 x $1\frac{1}{2}$			$5\frac{5}{8}$	$3\frac{3}{8}$	$5\frac{3}{8}$	$2\frac{1}{2}$	2.00
632	$2\frac{1}{2}$ x 2 x 2			$5\frac{7}{8}$	$3\frac{1}{8}$	$5\frac{1}{4}$	$2\frac{5}{8}$	2.00

Carried in stock in all sections of the country.

Order by number.

# Pop Safety Valves

Low-Pressure Ideal, Brass

Stock No. 968

Norwall, for Vacuum Heating

Stock No. 967



These are strictly high-grade articles and possess the genuine popping feature. They are not mere relief valves. Recommended for pressure not exceeding 20 pounds. Have nickel-plated, extra-heavy iron hexagon bushing connections, on which an ordinary wrench can be used, and which cannot be easily strained or crushed by a heavy wrench.

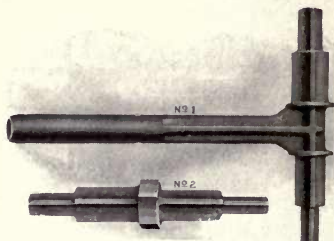
Ideal Valve

## Price List

Size, inches.....	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3
Stock No. 968, each.....	\$ 2.75	3.00	3.75	5.00	6.75	11.75	16.00
“ “ 967, “ .....	10.00	12.00	15.00	20.00	30.00	50.00	65.00

# Ideal Spud Wrench

These tools are most convenient for connecting up union Radiator valves or union elbows. Connections can be made up quicker, tighter, and without injuring the union. Style 1 is used hand-to, and has an open hexagon on end of handle for adjusting bolt nuts. Style 2 is used with a Stillson wrench. Either tool embraces



Style 2  
Stock No. 591

Style 1  
Stock No. 590

$1\frac{1}{2}$ -,  $1\frac{1}{4}$ -, 1-, and  $\frac{3}{4}$ -inch sizes. Made of malleable iron.

List Prices each: Style 1 \$0.75; Style 2 \$0.50

## Radiator Brushes

Stock No. 971



The brush illustrated above is specially designed for use on Radiators, the shape being such that it will pass between the sections, cleaning surfaces which could not otherwise be reached. These brushes are thoroughly well made, and very serviceable. List Price each \$0.75.

## Ideal Fitch Brushes

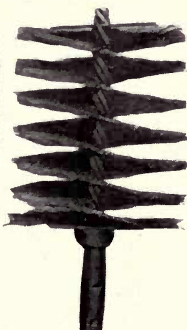
Stock No. 972



We are prepared to furnish best-grade Fitch Brushes in any size desired.

NOTE.—Never put a Fitch Brush in water, as this causes the block or handle to swell and split. Brushes may be kept in best of condition by immersing in bronzing liquid, turpentine, enamels, etc.

## Ideal Boiler Brushes



Round  
2", 2½", 3", 4"

1904  
4½" x 4" x 1¾"

Export  
6" x 4½" x 2¾"

Oval  
2¾" x 4" x 1"

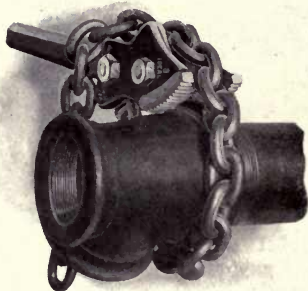
When ordering Flue Brushes, in all cases show on order size and style of Boiler for which they are intended.

For uses and list prices on the above Flue Brushes, see page 205.



# The Ideal Chain Wrench

Stock No. 900



This Wrench is made with two drop-forge jaws having a double row of biting surfaces. It will grip pipe, fittings, flanges, round, square, or irregular castings—easily, quickly—just where the grip is needed. The two outer surfaces will bite and grip pipe or flat surfaces, while the two inner surfaces will take hold of the beads of fittings, or edges of valves, flanges, etc. No one-sided gripping—always takes hold with both

jaws. The lock takes the chain so firmly and surely that there is no slipping out and the chain does not fall out of the lock. Handle is made of spring steel, and handle and the parts are extra strong and will not bend, pull apart, or break. Very simple—only four main parts and two bolts. Ordinary cable chain which can be bought at any hardware store is used. If a link breaks, by pulling out the bolt which holds the chain, discarding broken link and reattaching, the wrench is again quickly ready for work. Jaws easily tempered and sharpened when necessary. Very durable and reliable. Send for circular and discounts.



The Double-Faced Jaws

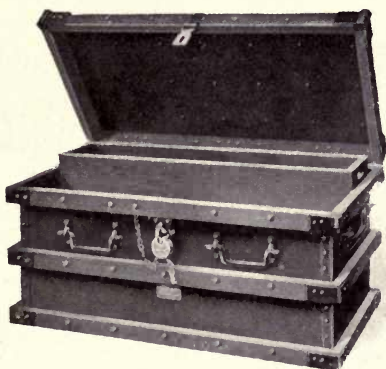
## Measurements and Weights

Number of Wrench.....	2	3	4	5
Capacity, size pipe.....	$\frac{1}{2}$ to $3\frac{1}{2}$	1 to 5	2 to 8	$2\frac{1}{2}$ to 12
Capacity, size fittings ....	$\frac{1}{2}$ to 3	1 to 4	2 to 6	$2\frac{1}{2}$ to 10
Size of Cable Chain.....	3-8	13-32	1-2	19-32
Length of Wrench.....	27 in.	38 in.	49 in.	61 in.
Weight of Wrench.....	10 lbs.	18 lbs.	28 lbs.	50 lbs.

## List Prices

Wrench, with Cable Chain	\$6.00	\$8.00	\$11.00	\$16.00
Wrench, with Flat Chain..	6.90	9.20	12 65	18.40
Jaws, per pair .....	3.25	4.50	5.85	7.50
Handles, each.....	2.10	3.25	4.75	6.90
Cable Chains, each.....	.95	1.20	1.70	3.00
Flat Chains, each .....	2.00	3.00	4.00	6.00
Steel Pins, each .....	.15	.20	.25	.30
Bolts, each .....	.20	.25	.30	.35

# Portable Steel Tool Chests



Style "A"

Made from  $\frac{1}{8}$ -inch cold-rolled sheet steel with malleable iron corner pieces and hardwood braces; fitted with heavy wrought-iron hinges and hasp, with cover so arranged as to be held open by support from the back of chest. Each chest is furnished with a first-class brass lock and two keys, and bolts to screw down cover at front corners. They are lighter and cheaper than any first-class make of wood chest, and will outwear several wood chests. They are painted, well proportioned and ornamental in design, and make a first-class tool chest for Steam-Fitters, Gas-Fitters, Plumbers, and other trades where a light and strong tool-chest is required. In four types.

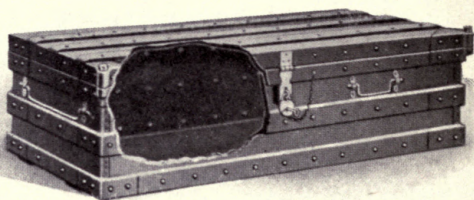
## Style A—With One Drawer

	List
No. 673, 11 in. deep, 12 in. wide, 24 in. long, weight 60 lbs.	\$12.50
No. 674, 14 in. deep, 15 in. wide, 30 in. long, weight 95 lbs.	17.00
No. 675, 16 in. deep, 17 in. wide, 36 in. long, weight 125 lbs.	19.00
No. 676, 19 in. deep, 20 in. wide, 42 in. long, weight 155 lbs.	22.00

## Style A—With Two Drawers

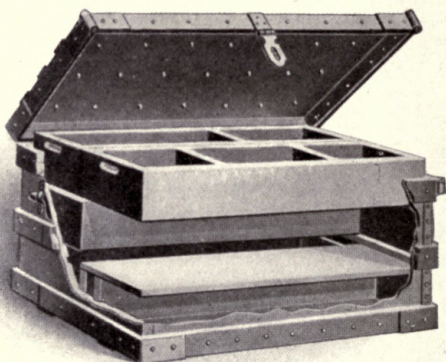
	List
No. 677, 11 in. deep, 12 in. wide, 24 in. long, weight 60 lbs.	\$13.00
No. 678, 14 in. deep, 15 in. wide, 30 in. long, weight 95 lbs.	18.00
No. 679, 16 in. deep, 17 in. wide, 36 in. long, weight 125 lbs.	20.25
No. 680, 19 in. deep, 20 in. wide, 42 in. long, weight 155 lbs.	23.50

# Portable Steel Tool Chests



Style "C"

	List
No. 681, 11 in. deep, 12 in. wide, 30 in. long, weight 70 lbs.	\$12.50
No. 682, 11 in. deep, 12 in. wide, 36 in. long, weight 105 lbs.	15.00
No. 683, 11 in. deep, 12 in. wide, 42 in. long, weight 140 lbs.	17.00
No. 684, 11 in. deep, 12 in. wide, 48 in. long, weight 180 lbs.	20.00



Style "D"

	List
No. 685, 11 in. deep, 12 in. wide, 24 in. long, weight 80 lbs.	\$15.50
No. 686, 14 in. deep, 15 in. wide, 30 in. long, weight 120 lbs.	21.00
No. 687, 16 in. deep, 17 in. wide, 36 in. long, weight 155 lbs.	23.00
No. 688, 19 in. deep, 20 in. wide, 42 in. long, weight 185 lbs.	26.00

# Ideal Burring Reamers

For Pipe  $\frac{1}{8}$  to 2-inch



No 984. Diameter from 0 at point to  $\frac{5}{8}$  inch at largest part. Length of fluting  $\frac{5}{8}$  inch. For

pipe  $\frac{1}{8}$  to  $\frac{1}{2}$  in. Each \$0.50. Postage on single reamer, \$0.06.

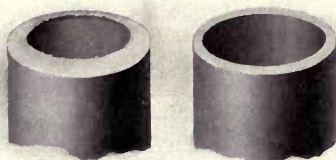
No. 985. Diameter at point  $\frac{7}{16}$  inch. Diameter at largest part  $1\frac{1}{4}$  inches. Length of fluting  $1\frac{9}{16}$  inches. For pipe  $\frac{1}{2}$  to 1-inch. Each \$1.25. Postage on single reamer, \$0.08.

No. 986. Diameter at point  $1\frac{3}{16}$  inches. Diameter at largest part  $2\frac{1}{8}$  inches. Length of fluting  $1\frac{1}{2}$  inches. For pipe  $1\frac{1}{4}$  to 2-inch. Bit-brace Shank. Each \$3.50. Postage on single reamer, \$0.24.

For Pipe  $\frac{1}{2}$ - to 2-inch

No. 987. Diameter at point  $\frac{7}{16}$  inch. Diameter at largest part  $2\frac{1}{4}$  inches. Length of cutter  $2\frac{5}{8}$  inches. Price complete \$2.25. Extra cutters each \$0.12. Postage on single reamer, \$0.25.

The single cutting blade, set in the hardened steel holder, cuts smoothly, steadily, and easily, taking an even chip like a plane without digging in, catching, and sticking. This cutter being triangular in shape (three cutting edges) may be

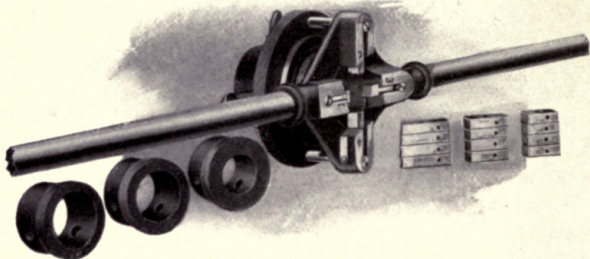


Before Burring

After Burring

turned twice, presenting each time a fresh edge to the work, and it may also be shifted lengthwise for the same purpose. Cutters can be renewed at price above quoted.

# The Toledo Pipe - Threading Devices



Adjustable Threader No. 1

## Adjustable Threading Devices

With No. 1 Device, one man can thread 2-inch pipe easily with one hand. No. 1-A stock is adapted for threading pipe in contracted places, otherwise inaccessible—as against walls, between floors or beams and in ditches. No. 1-A is the same as No. 1 machine, except with ratchet attachment.

### List Prices

No. 1 (Stock No. 565) Capacity 1- to 2-inch pipe, inclusive, each.....	\$24.00
No. 1-A (Stock No. 566) Capacity 1- to 2-inch pipe, inclusive, with Ratchet, each.....	30.00
Extra Dies (Stock No. 570) 1-, 1¼-, 1½-, or 2-inch, per set of 4 pieces.....	2.50

## Geared Adjustable Threading Devices

With No. 2 device, one man can thread 2½ inches of pipe in one minute; 3 inches in one and one-half minutes; 3½ inches in four minutes; 4 inches in six minutes. With Nos. 3 and 4, one man alone can thread any size of pipe from 4½-to 12-inches, inclusive.

### List Prices

No. 2 (Stock No. 567) Capacity 2½- to 4-inch pipe, inclusive, each.....	\$100.00
No. 3 (Stock No. 568) Capacity 4½- to 8-inch pipe, inclusive, each.....	300.00
No. 4 (Stock No. 569) Capacity 9- to 12-inch pipe, inclusive, each.....	500.00
Weight: No. 2, 60 lbs.; No. 3, 190 lbs.; No. 4, 225 lbs.	

### Extra Dies

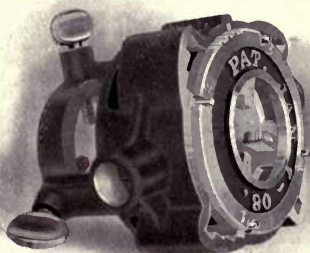
No. 2 (Stock No. 570) 2½, 3, 3½, and 4 inches, set of 5 pieces	\$8.00
No. 3 (Stock No. 570) 4½, 5, 6, 7, and 8 inches, set of 5 pieces	12.00
No. 4 (Stock No. 570) 9, 10, and 12 inches, set of 5 pieces.....	20.00

Weights: No. 1, 25 pounds; No. 1-A, 25 pounds; No. 1½-R, 40 pounds; No. 2, 100 pounds; No. 3, 200 pounds; No. 4, 300 pounds.



# The Toledo Pipe - Threading Devices

Adjustable for threading four sizes of pipe with one set of dies. Capacity, 1- to 2-inch. A much longer taper thread may be secured with this tool than any other — satisfying the need of ice-plant builders, who require long-threaded joints for ammonia pipes.



**Adjustable Threader No. 10**

Left-hand dies will be furnished when desired, which, however, will only thread one size pipe. In other words, to cut 1-inch,  $1\frac{1}{4}$ -inch,  $1\frac{1}{2}$ -inch, and 2-inch left-hand threads, the four sets of left-hand dies for the respective sizes are necessary.

Complete in itself; no loose parts, bushings, or extra dies. The thumb-screws are of the "Toledo" micrometer pattern, enabling the operator to center the tool on the pipe without bushings.

Weight: No. 10, 25 lbs. (Stock No. 563), List Price \$28.00.



## Toledo Pipe Vises

**Stock No. 571**

Holds securely any size pipe from  $\frac{1}{8}$  inch to  $2\frac{1}{2}$  inches in diameter; valves, tees, ells, or any other irregular-shaped fitting.

The gripping surfaces are  $1\frac{3}{4}$  inches wide, the upper jaws are drop-forged from tool steel, tempered, and will hold brass or nickel-plated pipe without marring or stripping it. It holds any fitting allowing  $\frac{1}{4}$ -inch gripping surface, thus permitting work flush with the grip.

14 inches high,  $8\frac{1}{2}$  inches wide, and has an iron bench flange 4 inches wide.

### List Prices

No. 1. Capacity  $\frac{1}{8}$ " to  $2\frac{1}{2}$ " pipe.....\$10.00. Weight, 17 pounds  
No. 2. Capacity  $\frac{1}{8}$ " to  $4\frac{1}{2}$ " pipe.....\$20.00. Weight, 45 pounds

We can furnish Toledo Vise Mounts and Toledo Pipe Cutters.  
Catalogue on application.

# Directions for Ordering Radiators

1. Give full name of Radiator.
2. With every order give full shipping instructions.
3. Always state whether for Steam or Water, and give heights.
4. If for Steam, specify whether for one- or two-pipe work.
5. When ordering leg sections, advise whether for supply or return connection, also stating size of tapping required, and whether for use on one- or two-pipe Steam, or for Water.
6. When ordering leg or intermediate sections, it is desirable to give date of invoice covering Radiators for which the loose sections are wanted.
7. In ordering Radiators, keep as close as possible to regular goods; special tappings and shapes frequently cause delay.
8. For convenience in handling, customers should, as far as possible, avoid ordering Direct Radiators in larger than a 32-section stack. Radiators of 1,000 pounds weight or over are liable to be strained or broken in transportation, and it is recommended that customers order these large Radiators to be shipped in halves.
9. In ordering Curved or Corner Radiators, specify exact radius or angle of the base-board at floor within which the Radiator is to be placed, and show by sketch which end of Radiator is for supply connection and which for return, as you face the inside of curve or angle.
10. For convenience in handling, Indirect Radiators will be shipped loose. Customers should, when ordering, be particular to specify the size of stacks into which sections are intended to be built, so that necessary supply and return sections may be shipped.
11. All correspondence in relation to orders and shipments should be addressed to the Branch with which order is placed, and not to Plant.
12. Arrange orders after following form (quantity of these printed forms will be promptly mailed to customers, on application), and be sure to sign your orders:—

Dated Chicago, Oct. 1, 1908

When wanted At once

AMERICAN RADIATOR CO.,  
CHICAGO, ILL.

Our Order No. 1000

Ship to John Doe.

Charge to \_\_\_\_\_

Via R. R. Kansas City.

Richard Roe.

the following Radiators. Mo.

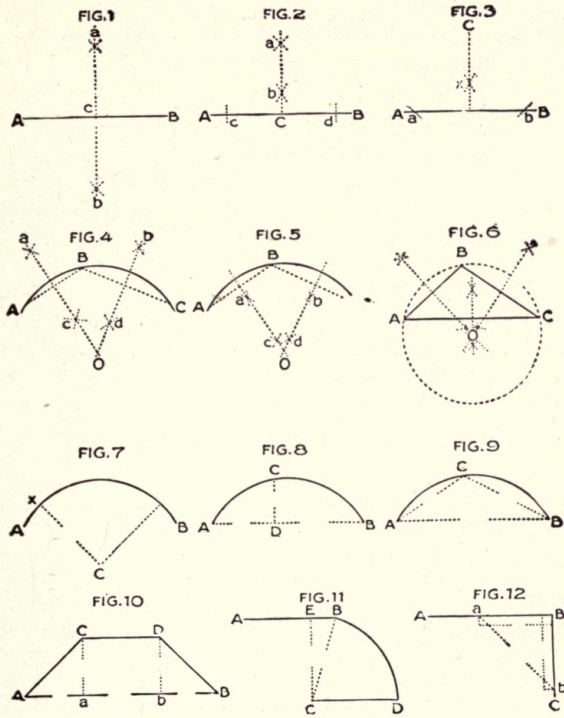
Chicago, Ill.

No. of Radiators	Sections	Height	Kind	Style	Columns	Tapped	Remarks
3	8	38	Steam	Rococo	3	2-pipe regular	

(Sign here)

# Instructions in Geometrical Drawing

Instructions in Geometrical Drawing, to aid the steam-fitter in making accurate drawing to show exact radius or angle within which Curved or Corner Radiator is to be placed.



For explanation of above drawings, see pages 184 and 185.  
For list of Curved and Corner or Angle Radiators made at our Plants, see pages 94 and 95.

# Instructions in Geometrical Drawing

(Continued)

## To bisect a line

Fig. 1. With point  $A$  as a center, and a radius greater than one-half  $AB$ , describe the arcs  $a$  and  $b$ . With  $B$  as a center using radius equal to  $Aa$ , describe arcs  $b$  and  $b$ . A line drawn through intersections of arcs  $a$  and  $b$  will divide line  $AB$  into two equal parts, as  $Ac$  and  $cB$ .

## To erect a perpendicular at a given point in a line

Fig. 2. At equal distances from the given point  $C$  in the line  $AB$ , lay off points  $c$  and  $d$ . With  $c$  as a center and with a radius greater than one-half of  $cd$ , describe arc  $a$ . With  $d$  as a center and using radius equal to  $ca$ , describe intersecting arc  $a$ .

With  $c$  and  $d$  as centers and a radius less than  $ca$ , but greater than one-half of  $cd$ , describe the arcs which intersect at  $b$ . A line drawn through the intersecting arcs  $a$  and  $b$  will be perpendicular to line  $A$  and  $B$  at the given point  $C$ .

## From a given point without a line, to let fall a perpendicular to that line

Fig. 3. With given point  $C$  as a center and a radius greater than the distance from  $C$  to line  $AB$ , describe an arc of a circle which will intersect the line in two places, as  $a$  and  $b$ . With  $a$  and  $b$  as centers and equal radii, describe arcs which intersect at  $x$ . A line drawn from point  $C$  through intersection of arcs to line  $AB$  will be perpendicular to that line.

## The arc of a circle being given, to find the center of the circle of which the arc is a part

Fig. 4. On the arc  $ABC$  take any three points as  $A$   $B$   $C$ . Join points  $A$ ,  $B$  and  $C$  by lines  $AB$  and  $BC$ . Bisect lines  $AB$  and  $BC$  by method shown in Fig. 1. The bisecting lines  $oa$  and  $ob$  will intersect at point  $o$ , which will be the center of the circle of which the arc  $ABC$  is a part.

Fig. 5. Same as Fig. 4, excepting that in bisecting lines  $AB$  and  $BC$  the intersecting arcs are all within the circle.

# Instructions in Geometrical Drawing

(Continued)

## To circumscribe a circle about a given triangle

Fig. 6. Bisect the sides  $AB$ ,  $BC$ , and  $AC$  of the triangle  $ABC$ . The three bisectors will meet at point  $O$ . With  $O$  as a center and radius equal to  $OB$ , draw circle  $ABC$ . In taking measurements for curved or angle Radiators, be sure that measurements are taken from base-board, or projections which the Radiator must clear.

For Curved Radiators, give us either the radius, as in Fig. 7, or, as in Fig. 8, the length of the line,  $AB$ ; the length of the perpendicular let fall from point  $C$  to line  $AB$ , and the distance of the perpendicular from points  $A$  and  $B$ , as  $AD$  and  $DB$ . Or take any three points in the arc  $ABC$ , in Fig. 9, and give length of sides of triangle formed by joining these points.

In ordering Curved Radiators, specify exact radius or angle of the base-board at floor within which the Radiator is to be placed. When measurements are given, send sketch (or template preferred) showing location of supply tapping and the measurements called for in this paragraph.

For Angle Radiators, it is necessary that we know the exact angle to which the Radiator must conform. We want, therefore, sufficient information to enable us to lay out angles correctly.

In ordering Angle Radiators, specify exact radius of angle of the base-board at floor within which the Radiator is to be placed. When measurements are given, send sketch (or template preferred) showing location of supply tapping and the measurements called for below, under Figures 10, 11, or 12.

Fig. 10. Take any two points on the sides  $AC$  and  $DB$ , as  $Aa$ , and join them with line  $AB$ . From the vertex of angle  $C$  let fall a perpendicular to line  $AB$ , as  $Ca$ . From vertex of angle  $D$  let fall a perpendicular to line  $AB$ , as  $Dd$ . Then give us the following dimensions;  $Aa$ ,  $ab$ ,  $bB$ ,  $aC$  and  $bD$ .

Fig. 11. Determine the radius of arc  $BD$  by method shown in Figures 4 or 5. From point  $C$ , the center of circle of which arc  $BD$  is a part, erect a perpendicular to line  $AB$ , as  $CE$ . Give length of radius  $CB$  and perpendicular  $CE$ .

Fig. 12. With the vertex of the angle  $B$  as a center, lay off equal distances  $Ba$  and  $Bb$ . Join points  $a$  and  $b$ , and give lengths of sides  $aB$ ,  $Bb$ , and  $ab$  of the triangle thus formed.



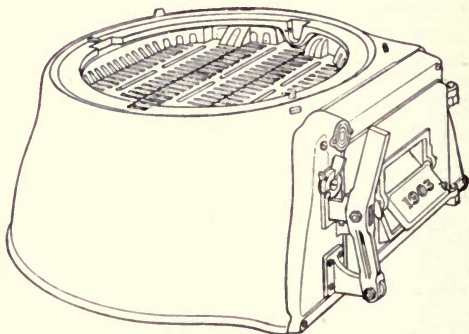
# How to Order Boiler Parts

To assist our customers to order Grate Bars and other castings which may be required for IDEAL Boilers, we present herewith various lists and erection data, together with outline illustrations of Bases and Grates of the old and new style Round Boilers.

To avoid confusion or error in executing orders, we request that the following detailed information (as far as the specifications can be readily secured) should be sent with orders for the parts desired:

- |                                 |   |
|---------------------------------|---|
| 1—Name or sketch of part.       | 5—Number on brass plate of fire door.             |
| 2—Pattern number cast on part.  | 6—Date of original purchase.                      |
| 3—If grate bar, state position. | 7—Name of dealer who originally purchased Boiler. |
| 4—Name and number of Boiler.    |   |

## Arco Base and Grate Parts



All Regular Arco Steam and Water Boilers and Standard Water Boilers are equipped with the Arco Base. No changes have been made up to the present time except in location of draft inlet.

## Grate Bars

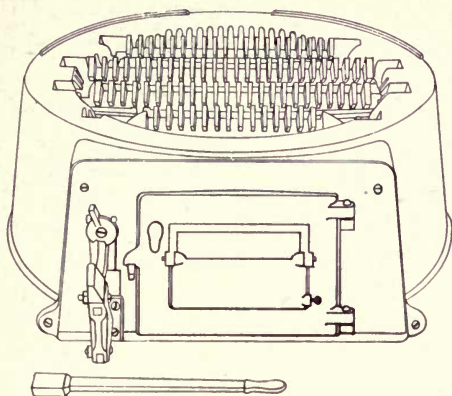
15-, 17-, 19-, and 22-inch have three Bars: Front, Center, Back. Shakes on left side, front.

25-, 28-, 31-, and 34-inch have four Grate Bars: Front, Front-Center, Rear-Center, Back. This Grate shakes on left-hand side in front

### List Prices—Arco Base and Grate Parts

Nominal Diameter of Grate.....	15-in.	17-in.	19-in.	22-in.	25-in.	28-in.	31-in.	34-in.
Base Casting only.	\$10.00	\$11.75	\$14.00	\$16.25	\$22.00	\$24.50	\$29.50	\$39.00
Base Front Frame.	1.75	2.00	2.75	3.25	3.50	4.25	4.50	5.50
Base Door.....	1.00	1.00	1.00	1.25	1.50	1.50	1.75	1.75
Base Butterfly D'r.	.50	.50	.50	.50	.50	.75	.75	.75
Grate Ring.....	3.75	4.25	5.25	6.75	7.25	9.00	10.00	12.50
Front Grate Bar...	1.00	1.25	1.50	2.00	1.75	2.50	3.25	3.75
Center Grate Bar..	1.25	1.50	2.00	2.50	2.50	3.50	4.50	5.75
Back Grate Bar...	1.00	1.25	1.50	2.00	1.75	2.50	3.25	3.75
Connecting Bar...	.60	.60	.60	.75	1.00	1.00	1.00	1.00
Connecting Arm...	.60	.60	.60	.60	.60	.60	.60	.75
Angle Lever.....	.60	.60	.60	.60	.60	.75	.75	.75
Shaker Handle....	.75	.75	1.00	1.00	1.00	1.00	1.50	1.50

## Second Pattern Premier Base and Grates



All regular Premier Boilers made from the second pattern (since early part of 1908) were equipped with above type of Base and Grates. No changes have been made since its adoption.

### Grate Bars

15-, 18-, and 21-inch have three Bars: Front, Center, and Back. Shakes in front on left-hand side.

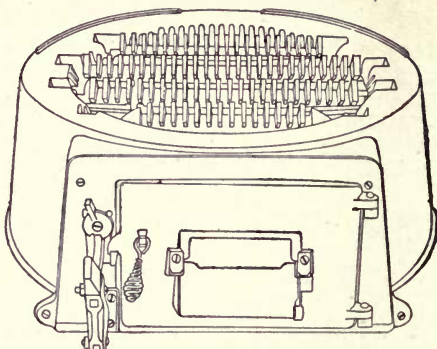
24- and 27-inch have four Bars: Front, Front Center, Rear Center, and Back. Shakes in front on left-hand side.

### List Prices—Second Pattern Premier Base and Grates

Nom. Diam. of Grate . . .	15-in.	18-in.	21-in.	24-in.	27-in.
Base Casting only . . . . .	\$11.00	\$14.50	\$17.50	\$19.50	\$22.50
Base Front Frame . . . . .	2.25	2.25	2.50	2.50	3.25
Base Door . . . . .	1.25	1.25	1.50	1.50	1.50
Base Butterfly Door . . . . .	.50	.50	.50	.50	.75
Front Grate Bar . . . . .	1.00	1.50	1.75	2.25	2.50
Center Grate Bar . . . . .	1.25	1.75	2.75	3.00	3.50
Back Grate Bar . . . . .	1.00	1.50	1.75	2.25	2.50
Connecting Bar . . . . .	.50	.75	.75	1.00	1.00
Connecting Arm . . . . .	.50	.50	.50	.50	.60
Angle Lever . . . . .	.60	.60	.60	.60	.75
Shaker Handle . . . . .	.75	.75	.75	.75	.75

# First Pattern Premier Base and Grate

All Regular Premier Boilers are equipped with this Base and Grate. Also used on regular Portable Steam Boilers, April 19, 1901, to March 1, 1902, and all regular Portable Water and Invincible Steam and Water Boilers, June 17, 1901, to March 1, 1902. Specify Catalogue No. of Boiler.



## Grate Bars—Style Used from 1903 to 1908

10-inch has Draw Center Grate. 12-inch has 2 Bars: Front, Back. 15-, 18-, and 21-inch have three Bars: Front, Center, Back. Shaker on left-hand side in front.

24-, 28-, and 32-inch Grates have four Bars: Front, Front-Center, Rear-Center, Back. Shaker on left-hand side in front.

## Grate Bars—Older Styles—Prior to May and October, 1903

10-Inch Premier Grate shaking from the side was used on all No. 101 Premier Boilers until April 25, 1903 (Serial A-5319), when the present type of Draw Center Grate was adopted.

12-Inch Premier Grate shaking on the side was used on all 12-inch Premier Boilers until May 12, 1903 (Serial A-5419), when the present style of Premier Grate shaking in front was adopted.

15-Inch Junior Grate shaking on the side was used on all 15-inch Premier Boilers until October 29, 1903 (Serial A-5125), when the above style Premier Grate was used, till 1908, when the second was adopted.

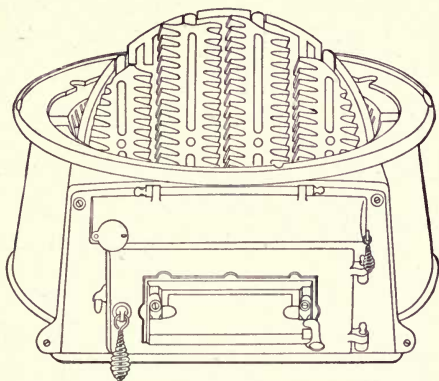
18-Inch Junior Grate shaking on the side was used on all 18-inch Premier Boilers until May 23, 1903 (Serial No. 5067), when the above style Premier Grate was used, till 1908, when second pattern was made.

21-, 24-, 28-, 32-Inch—No changes on Grates until 1908, when the second pattern was adopted.

Nominal Diameter of Grate, inches.	10	12	15	18	21	24	28	32
Base Casting . . . .	3.50	9.50	13.25	14.25	17.25	21.00	23.75	31.00
Base Front Frame. . . . .	. . . .	1.75	2.00	2.00	2.25	2.25	2.50	3.00
Base Door. . . . .	.60	1.00	1.00	1.00	1.25	1.50	1.50	2.00
Base B'fly Door. . . . .	. . . .	.40	.50	.50	.50	.50	.60	.60
Base Door Slide D'r . . . .	.40	. . . .	. . . .	. . . .	. . . .	. . . .	. . . .	. . . .
Base Shaker Door. . . . .	.40	. . . .	. . . .	. . . .	. . . .	. . . .	. . . .	. . . .
Base Top Ring. . . . .	. . . .	. . . .	2.25	2.75	. . . .	. . . .	. . . .	. . . .
Grate Ring. . . . .	. . . .	2.00	. . . .	. . . .	. . . .	. . . .	. . . .	. . . .
Grate for Cen. Slide . . . .	1.00	. . . .	. . . .	. . . .	. . . .	. . . .	. . . .	. . . .
Grate Center Slide. . . . .	.40	. . . .	. . . .	. . . .	. . . .	. . . .	. . . .	. . . .
Front Grate Bar. . . . .	. . . .	1.00	1.25	1.50	2.00	1.75	2.50	3.75
Center Grate Bar. . . . .	. . . .	. . . .	1.50	2.00	2.50	2.50	3.50	5.75
Back Grate Bar. . . . .	. . . .	1.00	1.25	1.50	2.00	1.75	2.50	3.75
Connecting Bar. . . . .	. . . .	.40	.60	.60	.75	1.00	1.00	1.25
Connecting Arm. . . . .	. . . .	.40	.60	.60	.60	.60	.60	.75
Angle Lever. . . . .	. . . .	.60	.60	.60	.60	.60	.60	.75
Shaker Handle. . . . .	.40	.75	1.00	1.00	1.00	1.00	1.00	1.50

\*See page 202 for prices 1908 pattern Premier Grate.

# Perfection Base and Grate Parts



Perfection Grates were used on all regular Portable Water and Invincible Steam and Water Boilers from June, 1897, to June 17, 1901. After March 1, 1902, all Portable and Invincible Boilers were again fitted with the Perfection Base.

## Grate Bars

19-inch has three Grate Bars: 1 Left-Hand with shank, 1 Center, 1 Right-Hand without shank. This Grate shakes on left-hand side in front.

21- and 25-inch have four Grate Bars: 1 Left-Hand with shank, 2 Center, 1 Right-Hand without shank. This Grate shakes on left-hand side in front.

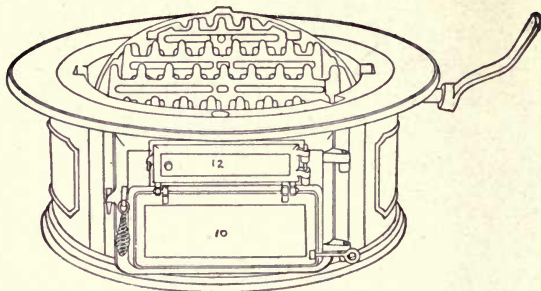
30- and 36-inch have four Grate Bars: 1 Left-Hand with shank, 2 Center, 1 Right-Hand with shank. This Grate shakes in two halves in front.

## List Prices—Perfection Base and Grate Parts

Nominal Diam. of Grate, Inches .....	19	21	25	30	36
Base Castings, only.....	\$14.00	\$17.00	\$18.50	\$21.00	\$36.00
Base Top Ring, wide* .....	8.50	9.00	11.50	13.50	16.00
Base Top Ring, narrow....	3.75	4.25	5.25	6.50	9.00
Grate Ring .....	3.00	4.00	4.50	7.00	9.00
Base Door .....	1.25	1.25	1.25	1.50	1.50
Base Butterfly Door.....	.50	.50	.75	.75	.75
Right-Hand Grate Bar....	1.25	1.25	1.50	3.00	5.00
Left-Hand Grate Bar .....	1.50	1.50	1.75	3.00	5.00
Center Grate Bar, each ...	2.00	1.75	2.50	4.25	7.00
Grate Connecting Bar, each	.50	.75	.75	.50	.75
Base Front Frame .....	1.75	1.75	2.25	3.00	3.50
Base Front Extension*....	2.25	2.50	2.75	3.25	3.75
Clinker Door .....	.50	.60	.75	.75	.75
Shaker Handle.....	1.25	1.25	1.25	1.25	1.25

\* Used on Portable Steam Boilers only.

## Old Style Base and Grate Parts



The Old-Style Pattern of Grate was used on all Portable Boilers until the Fall of 1896, at which time the Center-Grate Bar of the 19-, 25-, 30-, and 36-inch size was changed somewhat. This type of Grate was discontinued in June, 1897.

### Grate Bars

The Old-Style Grate shakes at the side of the Boiler. It consists of the following Bars:—

19-, 21-, 25-inch have five Bars: Two Outside Bars, two next to Center Bars, one Center Bar with spindle.

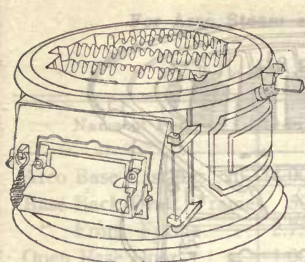
30-, 36-inch have seven Bars: Two Outside Bars, two next to Outside Bars, two next to Center Bars, one Center Bar with spindle.

### List Prices—Old-Style Base and Grate

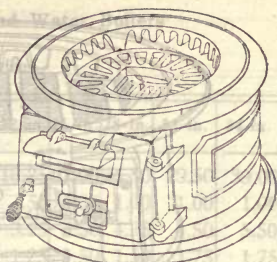
Nominal Diam. of Grate	19-in.	21-in.	25-in.	30-in.	36-in.
Base Bottom Plate.....	\$ 1.50	\$ 2.50	\$ 3 00	\$ 4.25	\$ 8 00
“ “ Ring .....	4.75	5.25	7.75	11.00	15.00
“ “ Front Panel ..	2.00	2.25	3.00	3.25	3.75
“ Back Panel. ....	2.25	2.25	3.00	3.50	4.50
“ Right-Hand Panel.....	2.00	2.50	2.75	3.50	5.00
“ Left-Hand Panel .....	2.25	2.50	3 00	3.25	4.25
“ Top Ring (Water Boil'rs)	4.25	5.00	6.00	7.75	11.00
“ “ “ (Steam “ )	9.00	11.00	13.50	17.00	21.50
Grate Ring .....	3.50	4.00	5.75	7.75	9.25
Ashpit Door .....	1.00	1.25	1.50	1.50	1.75
Clinker Door .....	.60	.60	.60	.60	.60
Lift Draft Door.....	.60	.60	.75	1.00	1.00
Shaker Handle.....	.75	.75	.75	1.00	1.00
Outside Grate Bar.....	1.00	1.25	1.75	1.75	2.50
Next to Outside Grate Bar ..	.....	.....	.....	2.75	4.00
Next to Center Grate Bar...	1.25	1.50	2.75	3.00	4.50
Center Grate Bar.....	1.50	1.75	3.00	3.25	4.50
Grate Connecting Bar.....	1.50	1.50	1.75	2.50	3.25
Shaking Spindle .....	.60	.60	.60	.75	.75
Dumping Spindle....	.40	.40	.40	.40	.40



# Junior Base and Grate Parts



Junior Rocking Grate



Junior Draw-Center Grate

The Grates supplied on all regular Junior Heaters made prior to March 25, 1897, were of the Junior Draw-Center pattern, still used on Grates of 10- and 12-inch diameter. All regular 15-inch Junior Heaters made after March 25, 1897, (Serial No. 514), and 18-inch Heaters made after March 27, 1897, were supplied with the present style of Junior Rocking pattern, consisting of three Bars.

## Grate Bars

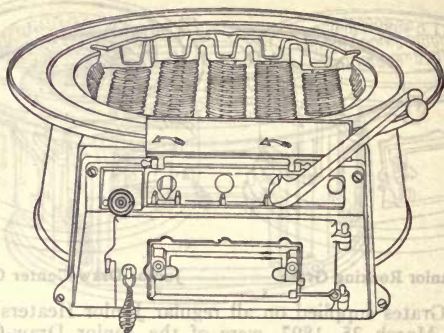
10-inch and 12-inch Grates have Draw-Center Bars. This Grate shakes in front of the Heater.

15- and 18-inch have Junior Rocking Grate with three Bars: Front, Center, Back. This Grate shakes at the side of the Heater.

## List Prices—Junior Base and Grate Parts

Nom. Diam. of Grate, Inches	10	12	15	18
Base Legs	\$ .25	\$	\$	\$....
Base Bottom	2.00	3.50	4.00	6.75
Base Panels, each		1.00	1.25	1.50
Base Casting	3.50			
Base Top Ring		2.75	4.00	4.50
Base Front Frame		.75	1.25	1.75
Base Door	.60	.75	1.00	1.50
Base Door Slide Damp'r	.40	.40		
Base Butterfly Door			.40	.40
Base Shaker Door	.40			
Shaker Door	.40	.60		
Circular Slide Grate	1.00	1.25		
Grate Center Slide	.40	.60		
Front Grate Bars			1.00	1.50
Shaker Grate Bar			1.50	2.00
Back Grate Bar			1.00	1.50
Grate Connecting Bar			.40	.60
Shaker Handle	.40	.40	.60	.60

# Triangular Grate and Base Parts



Triangular Grates were used on all regular Portable Steam Boilers from June, 1897, to January 16, 1899 (Serial M-1 to M-1342).

## Grate Bars

19-inch has three Grate Bars: All of same length.

21-inch has four Grate Bars: Two long and two short.

25- and 30-inch have five Grate Bars: Three long and two short.

36-inch has six Grate Bars: Four long and two short.

## List Prices—Triangular Grate and Base Parts

Nominal Diameter of Grate, Inches	19	21	25	30	36
Base Casting .....	\$14.75	\$17.75	\$23.25	\$31.00	\$39.00
*Base Extension.....	2.75	3.25	3.75	4.50	5.00
Base Front Frame.....	1.75	1.75	2.25	3.00	3.50
Base Door.....	1.25	1.25	1.25	1.50	1.50
Base Clinker Door.....	.60	.60	.60	.60	.60
Base Butterfly Door.....	.40	.40	.40	.40	.40
Narrow Base Top Ring....	3.75	4.25	5.25	6.50	6.75
*Wide Base Top Ring.....	8.50	9.00	11.50	13.00	15.50
Grate Bar, long.....	2.25	2.75	3.25	5.25	6.25
Grate Bar, short.....		2.25	2.50	4.25	5.00
Grate Bar Front Support...	.75	1.00	1.25	1.50	1.50
Grate Bar Journal Plate...	1.50	1.75	2.25	2.75	3.25
Grate Bar Gear Wheel.....	.40	.40	.40	.60	.60
Grate Bar Gear Collar.....	.40	.40	.40	.40	.40
Shaker Handle .....	1.00	1.00	1.00	1.00	1.00

\* Used on Portable Steam Boilers only.

## Important to Observe in Ordering

As stated on page 186, orders are executed more promptly when the following detailed information accompanies the order:—

- |                                |                                  |
|--------------------------------|----------------------------------|
| 1—Name or sketch of part.      | 5—Number on brass plate on door. |
| 2—Pattern number cast on part. | 6—Date of purchase.              |
| 3—Position of Grate Bar.       | 7—Name of dealer who original-   |
| 4—Name and number of Boiler.   | ly purchased the Boiler.         |

# Round Boiler Parts

For Arco Steam and Water Boilers 1908

## List Prices

Name of Part	19-in.	22-in.	25-in.	28-in.	31-in.	34-in.
Arco Base Castings . . . .	14.00	16.25	22.00	24.50	29.50	39.00
*Base Back Draft Frame . . . .	.50	.50	1.00	1.00	1.00	1.00
“ Front Frame . . . . .	2.75	3.25	3.50	4.25	4.50	5.50
Open Base Door . . . . .	1.00	1.25	1.50	1.50	1.75	1.75
*Closed Base Door . . . . .	1.75	1.75	2.00	2.00	2.25	2.25
Base Butterfly Door . . . . .	.50	.50	.50	.75	.75	.75
Front Grate Bar . . . . .	1.50	2.00	1.75	2.50	3.25	3.75
Center “ “ . . . . .	2.00	2.50	2.50	3.50	4.50	5.75
Back “ “ . . . . .	1.50	2.00	1.75	2.50	3.25	3.75
Connecting “ . . . . .	.60	.75	1.00	1.00	1.00	1.00
“ Arm . . . . .	.60	.60	.60	.60	.60	.75
Angle Lever . . . . .	.60	.60	.60	.75	.75	.75
Grate Ring . . . . .	5.25	6.75	7.25	9.00	10.00	12.50
Shaker Handle . . . . .	1.00	1.00	1.00	1.00	1.50	1.50
Base, Complete . . . . .	31.00	37.00	46.00	55.00	65.00	85.00
Firepot . . . . .	50.00	66.00	78.00	96.00	112.00	138.00
Fire Door Frame . . . . .	1.50	2.00	2.00	2.00	2.00	2.00
“ “ and Lining . . . . .	1.50	2.25	2.25	2.50	2.50	2.50
Clinker Door Frame . . . . .	.60	.75	1.00	1.25	1.25	1.25
“ “ and Lining . . . . .	.60	.75	.75	1.00	1.00	1.00
Arco Single Section . . . . .	16.00	21.00	25.00	32.00	38.00	42.00
“ Double “ . . . . .	28.00	40.00	48.00	64.00	74.00	85.00
“ Steam Dome . . . . .	33.00	43.00	54.00	64.00	72.00	90.00
“ Water “ . . . . .	15.00	22.00	25.00	32.00	45.00	54.00
C.O. Door Frame (narrow) . . . . .	1.00	1.00	1.00	1.25	1.25	1.50
“ “ and Lining “ . . . . .	1.50	1.75	1.75	1.75	2.00	2.25
“ “ Frame (med'm) . . . . .	1.25	1.50	1.75	1.75	1.75	1.75
“ “ and Lining “ . . . . .	2.25	2.75	3.00	3.25	3.25	3.50
“ “ Frame (wide) . . . . .	1.50	2.25	2.25	2.50	2.50	3.00
“ “ and Lining “ . . . . .	3.00	3.75	4.25	4.50	4.50	4.75
Smoke Hood, Complete . . . . .	3.75	4.50	4.50	7.50	7.50	9.00
Nipple, Push . . . . . {	2½"	3"	4"	4"	5"	5"
	.60	.60	.60	.60	.60	.60

\*Formerly used on Arco Steam Boilers.



# Round Boiler Parts

## For Standard Water Boilers

### List Prices

Name of Part	15-in.	17-in.	19-in.	22-in.	25-in.	28-in.	31-in.	34-in.
Base Casting .....	\$10.00	\$11.75	\$14.00	\$16.25	\$22.00	\$24.50	\$29.50	\$39.00
Base Front Frame. ...	1.75	2.00	2.75	3.25	3.50	4.25	4.50	5.50
Base Door.....	1.00	1.00	1.00	1.25	1.50	1.50	1.75	1.75
Base Butterfly Door...	.50	.50	.50	.50	.50	.75	.75	.75
Grate Ring.....	3.75	4.25	5.25	6.75	7.25	9.00	10.00	12.50
Front Grate Bar.....	1.00	1.25	1.50	2.00	1.75	2.50	3.25	3.75
Front Center Grate Bar	1.25	1.50	2.00	2.50	2.50	3.50	4.50	5.75
Back Center Grate Bar	.....	.....	.....	.....	2.50	3.50	4.50	5.75
Back Grate Bar.....	1.00	1.25	1.50	2.00	1.75	2.50	3.25	3.75
Connecting Bar.....	.60	.60	.60	.75	1.00	1.00	1.00	1.00
Connecting Arm.....	.60	.60	.60	.60	.60	.60	.60	.75
Angle Lever.....	.60	.60	.60	.60	.60	.75	.75	.75
Shaker Handle .....	.75	.75	1.00	1.00	1.00	1.00	1.50	1.50
Base Complete.....	21.00	25.00	31.00	37.00	46.00	55.00	65.00	85.00
Firepot .....	40.00	43.00	48.00	62.00	73.00	88.00	107.00	121.00
Fire Door Frame.....	1.50	1.75	2.00	2.00	2.00	2.25	2.25	2.25
Fire Door and Lining..	1.50	1.75	1.75	2.00	2.00	2.50	2.50	2.50
Clinker Door Frame...	.75	.75	.75	1.00	1.25	1.25	1.25	1.25
Clinker Door & Lining	.60	.60	.60	.75	.75	1.00	1.00	1.00
Inside Section.....	.....	12.00	13.00	16.50	20.00	26.00	29.00	35.00
Outside Section.....	8.75	12.25	13.50	17.50	21.00	27.00	32.00	37.00
Water Dome.....	9.00	12.00	13.00	17.00	20.00	26.00	29.00	35.00
1 Sec. C.O. Door Frame	.75	.75	.75	1.00	1.00	1.25	1.25	1.25
1 Sec. C. O. Door and Lining.....	.75	.75	.75	.75	.75	1.00	1.00	1.00
2 Sec. C.O. Door Frame	1.00	.....	.....	.....	.....	.....	.....	.....
2 Sec. C. O. Door and Lining.....	1.50	.....	.....	.....	.....	.....	.....	.....
3 Sec. C.O. Door Frame	.....	1.25	1.50	1.75	1.75	2.00	2.00	2.00
3 Sec. C.O. Door and Lining.....	.....	2.00	2.00	3.00	3.00	4.00	4.00	4.00
4 Sec. C.O. Door Frame	.....	1.50	1.50	2.00	2.00	2.75	2.75	2.75
4 Sec. C. O. Door and Lining.....	.....	3.00	3.00	4.00	4.00	5.25	5.25	5.25
Bottom ½ Smoke Hood	.60	.60	.75	.75	1.00	1.25	1.50	1.50
Top ½ Smoke Hood...	.60	.75	1.00	1.00	1.25	1.50	1.50	1.75
Smoke Hood Slide Damper .....	.60	.60	.75	1.00	1.00	1.00	1.50	1.50
Ch'k Draft Door Frame	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Check Draft Door. ...	.40	.60	.60	.60	.60	.60	.60	.60
Push Nipples, each ...	3" .60	3" .60	3" .60	4" .60	4" .60	5" .60	5" .60	6" .70

# Round Boiler Parts

For Premier Steam and Water Boilers, 1900-1908

## List Prices

Name of Part	15 In.	18 In.	21 In.	24 In.	28 In.	32 In.
Base Castings.....	\$13.25	\$14.25	\$17.25	\$21.00	\$23.75	\$31.00
Base Top Ring.....	2.25	2.75	.....	.....	.....	.....
Front Grate Bar.....	1.25	1.50	2.00	1.75	2.50	3.75
Center Grate Bar....	1.50	2.00	2.50	2.50	3.50	5.75
Back Grate Bar.....	1.25	1.50	2.00	1.75	2.50	3.75
Connecting Bar.....	.60	.60	.75	1.00	1.00	1.25
Connecting Arm.....	.60	.60	.60	.60	.60	.75
Base Front Frame....	2.00	2.00	2.25	2.25	2.50	3.00
Base Door.....	1.00	1.00	1.25	1.50	1.50	2.00
Butterfly Door.....	.50	.50	.50	.50	.60	.60
Angle Lever.....	.60	.60	.60	.60	.60	.75
Shaker Handle.....	1.00	1.00	1.00	1.00	1.00	1.50
Base Complete.....	25.00	27.50	30.00	37.00	44.00	62.00
Firepot.....	47.00	66.00	74.00	91.00	110.00	136.00
Fire Door Frame....	1.50	1.50	1.50	1.50	1.75	1.75
Fire Door and Lining	.75	.75	1.50	1.75	2.25	2.75
Clinker Door Frame..	.60	.60	1.00	1.00	1.00	1.25
Clinker Door and Lining.....	.60	.60	1.00	1.00	1.00	1.00
Narrow closed section	.....	12.50	21.00	25.00	34.50	48.50
Narrow open section	.....	.....	16.50	18.50	28.75	37.00
Wide open Section ..	.....	.....	30.00	35.50	46.00	57.00
Screw Nipple.....	5" 1.50	5" 1.50	6" 1.75	6" 1.75	8" 2.00	8" 2.00
Section Ring Com- plete.....	2.00	2.25	3.00	3.25	4.50	5.00
Steam Dome.....	21.00	27.00	50.00	60.00	78.00	94.00
Water Dome.....	12.50	18.00	28.00	36.00	46.00	59.00
Deflector Damper...	.75	.75	1.50	1.50	2.50	2.50
Smoke Hood Com- plete.....	3.25	3.25	5.50	5.50	9.00	9.00

## For Portable Water Boilers

## List Prices

Name of Part	19 In.	21 In.	25 In.	30 In.	36 In.
Firepot.....	\$41.00	\$51.00	\$61.00	\$73.00	\$ 91.00
First section over Firepot ...	20.00	25.00	33.00	48.00	62.00
Other intermediate Sections.	18.00	22.00	29.00	39.00	57.00
Dome Section.....	19.00	24.00	30.00	40.00	58.00
Fire Door Frame.....	2.00	2.00	2.00	2.00	2.00
Fire Door.....	1.00	1.00	1.00	1.00	1.25
Fire Door Lining.....	.75	.75	1.00	1.00	1.00
Clean-out Door Frame.....	.75	.75	.75	.75	.75
Clean-out Door.....	.40	.40	.40	.40	.40
Smoke Hood Complete.....	2.25	2.25	3.50	3.50	4.50
Push Nipple.....	3" .60	4" .60	4" .60	5" .60	6" .70



# Round Boiler Parts

For Portable Steam Boilers

## List Prices

Name of Part	19-in.	21-in.	25-in.	30-in.	36-in.
Firepot .....	\$42.00	\$53.00	\$63.00	\$75.00	\$ 92.00
First Section over Firepot .....	27.00	34.00	43.00	64.00	85.00
Other Intermediate Sections.....	24.00	30.00	39.00	56.00	76.00
Dome.....	37.00	45.00	62.00	82.00	110.00
Fire Door Frame .....	3.50	3.75	4.50	4.50	5.50
“ “ .....	1.00	1.00	1.25	1.25	1.50
“ “ Lining .....	.75	.75	.75	.75	1.00
2-Section Boiler Front Frame .....	5.00	5.25	6.50	7.25	.....
3- “ “ “ “ .....	5.50	6.50	7.75	8.25	11.25
4- “ “ “ “ .....	.....	7.25	9.00	9.25	13.75
5- “ “ “ “ .....	.....	.....	.....	.....	15.00
Narrow Clean-Out Door Frame....	1.50	1.75	2.25	2.25	2.50
“ “ “ “ .....	.40	.40	.40	.40	.40
Wide “ “ Frame ....	3.00	3.00	3.50	3.75	4.50
“ “ “ “ .....	1.00	1.00	1.25	1.25	1.50
Bottom Panels, each.....	1.75	2.25	2.50	3.25	4.00
“ “ C.O.Door, each....	.40	.40	.40	.40	.40
Lower Wide Panels, each.....	1.50	2.00	3.25	4.00	4.50
Center Narrow Panels, each.....	1.00	1.00	1.25	1.50	2.75
“ Wide “ “ .....	.....	1.75	2.25	3.25	4.00
Top “ “ “ “ .....	1.50	2.00	2.50	3.00	4.00
Dome Top Flue Strips, each.....	.50	.60	.60	.75	.75
“ Side “ “ “ “ .....	.40	.40	.40	.40	.40
Direct Draft Damper.....	.60	.60	.75	1.00	1.50
Smoke-Hood, Complete .....	9.00	11.75	14.00	18.25	26.00
Push Nipples, each .....	3".60	4".60	4".60	5".60	6".70

For Invincible Steam and Water Boilers

## List Prices

Name of Part	19-in.	21-in.	25-in.	30-in.	36-in.
Firepot .....	\$42.00	\$53.00	\$63.00	\$75.00	\$92.00
First Section over Firepot .....	27.00	34.00	43.00	64.00	85.00
Other Intermediate Sections.....	24.00	30.00	39.00	56.00	76.00
Dome, Steam .....	37.00	45.00	62.00	82.00	110.00
“ Water .....	22.00	27.00	38.00	54.00	68.00
Fire Door Frame .....	2.00	2.00	2.00	2.00	2.00
“ “ .....	1.00	1.00	1.00	1.00	1.25
“ “ Lining .....	.75	.75	1.00	1.00	1.00
Clean-Out Door Frame.....	.75	.75	.75	.75	.75
“ “ .....	.40	.40	.40	.40	.40
Smoke-Hood, Complete .....	2.25	2.25	3.50	3.50	4.50
Push Nipples, each .....	3".60	4".60	4".60	5".60	6".70

# Water Heater Parts

For Ideal Junior Tank Heaters

List Prices

Name of Part	10-in.	12-in.	15-in.	18-in.
Base Legs, each.....	\$ .25	\$.....	\$.....	\$.....
Base Bottom .....	2.00	3.50	4.00	6.75
Base Panels, each.....	.....	1.00	1.25	1.50
Base Casting .....	3.50	.....	.....	.....
Base Top Ring .....	.....	2.75	4.00	4.50
Base Front Frame .....	.....	.75	1.25	1.75
Base Door.....	.60	.75	1.00	1.50
Base Door Slide Damper.....	.40	.40	.....	.....
Base Butterfly Door .....	.....	.....	.40	.40
Base Shaker Door.....	.40	.....	.....	.....
Circular Slide Grate.....	1.00	1.25	*1.75	*3.50
Grate Center Slide.....	.40	.60	*.60	*1.00
Front Grate Bar.....	.....	.....	1.00	1.50
Shaker Grate Bar.....	.....	.....	1.50	2.00
Back Grate Bar.....	.....	.....	1.00	1.50
Grate Connecting Bar.....	.....	.....	.40	.60
Shaker Handle.....	.40	.40	.60	.60
Firepot.....	16.00	33.00	49.00	64.00
Inside Firepot Ring.....	1.50	.....	.....	.....
Outside Firepot Ring .....	1.75	.....	.....	.....
Fire Door Frame .....	.75	1.25	1.25	1.25
Fire Door .....	.40	.75	.75	.75
Clinker Door .....	.....	.40	.40	.40
Clinker Door Frame .....	.....	.60	.60	.60
Drop Tube .....	.....	2.00	3.50	6.50
Drop Tube Nipple.....	.....	3" 1.00	4" 1.25	4" 1.25
Intermediate Section.....	.....	.....	.....	12.50
Clean-Out Door.....	.....	.....	.....	.40
Section Ring .....	.....	.75	1.00	1.25
Water Dome .....	.....	12.00	13.50	18.50
Steam Dome .....	.....	.....	25.50	36.00
Nipple (screw).....	.....	4" 1.25	5" 1.50	5" 1.50
Smoke Hood complete .....	1.00	1.50	2.00	3.50

\*Used on Old Style Boilers.

For Arco Tank Heaters

List Prices

Name of Part	10-in.	12-in.	15-in.
Base .....	\$ 3.50	\$ 4.00	\$ 6.50
Base Bottom .....	1.75	2.25	3.25
Front Grate Bar.....	.75	1.25	1.00
Center Grate Bar.....	.....	.....	1.75
Back Grate Bar.....	1.00	1.50	1.00
Connecting Bar.....	.40	.40	.40
Base Door.....	.60	.75	.75
Butterfly Door .....	.40	.40	.40
Shaker Handle.....	.40	.40	.40
Base complete.....	8.50	10.25	14.50
Firepot.....	11.00	13.50	19.00
Clinker Door Frame .....	.60	.60	.60
Clinker Door .....	.40	.40	.40
Flue Ring .....	.60	.75	.75
Reducing Ring .....	.60	.60	.60
Sub-Top .....	2.25	2.50	3.75
Top.....	1.75	2.25	3.50
Cover .....	.40	.40	.60

# Sectional Boiler Parts

15-, 18-, 21-, 24-, 30-, and 36-inch

List Prices

Name of Part	15-in.	18-in.	21-in.	24-in.	30-in.	Old 36-in.
Front Section, S.....	\$25.00	\$40.00	\$52.00	\$61.00	\$87.00	\$131.00
"    "    W.....	22.00	37.00	46.00	57.00	77.00	116.00
"    Flue Conn., S.....	30.00	.....	65.00	.....	85.00	.....
"    "    W.....	25.00	.....	54.00	.....	76.00	.....
Center Conn., S.....	30.00	37.00	64.00	60.00	86.00	123.00
"    "    W.....	26.00	35.00	63.00	54.00	75.00	107.00
Center Section, S.....	30.00	36.00	61.00	59.00	85.00	115.00
"    "    W.....	25.00	34.00	54.00	52.00	75.00	101.00
Rear Conn. Section, S.....	30.00	37.00	62.00	60.00	86.00	120.00
"    "    W.....	25.00	34.00	54.00	54.00	79.00	105.00
Back Section, S.....	30.00	44.00	58.00	72.00	97.00	150.00
"    "    W.....	25.00	42.00	52.00	63.00	85.00	138.00
Nipples, Top, S.....	3" .60	6" .70	3" .60	6" .70	6" .70	6" .70
"    "    W.....	2" .60	3" .60	3" .60	4" .60	3" .60	6" .70
"    Bottom, S. and W....	2" .60	2" .60	3" .60	3" .60	3" .60	4" .60
Base Front Frame.....	2.50	3.00	4.00	4.25	6.25	10.75
"    Door.....	1.25	1.50	1.50	1.75	2.00	2.50
"    Butterfly Door.....	.50	.50	.60	1.00	1.00	1.00
"    Back Panel.....	2.25	3.25	4.00	4.00	5.50	9.00
"    "    Strip.....	1.50	.60	.75	.75	.75	2.25
Angle Lever.....	.60	.60	.60	.75	.75	.75
"    "    Conn. Arm, L. H..	.....	.60	.60	.60	.60	.60
"    "    R. H..	.....	.....	.....	.....	.....	.....
Short.....	.....	.....	.....	1.00	.....	.....
Angle Lever Conn. Arm, R. H.,	.....	.....	.....	.....	.....	.....
Medium.....	.....	.....	1.00	1.25	1.25	1.75
Angle Lever Conn. Arm, R. H.,	.....	.....	.....	.....	.....	.....
Long.....	.....	.....	1.25	1.50	1.50	2.00
Shaker Handle.....	.75	.75	.75	1.00	1.00	1.25
2- and 3-Lug Conn. Bar.....	1.25	.75	.75	.75	.75	1.00
4-Lug Conn. Bar.....	1.50	1.00	1.00	1.00	1.25	1.75
5- " " ".....	.75	1.25	.....	.....	.....	.....
6- " " ".....	2.00	1.50	.....	.....	.....	.....
7- " " ".....	2.25	1.75	.....	.....	.....	.....
Grate Bar, R. or L.....	2.50	2.25	4.00	3.75	6.50	10.25
1-Section Base Side.....	1.50	1.50	2.00	2.25	2.25	3.00
2- " " ".....	.....	3.00	3.25	3.50	3.50	5.25
4- " " ".....	5.00	5.00	5.75	.....	.....	.....
5- " " ".....	5.75	6.00	7.00	9.00	9.00	11.50
6- " " ".....	7.00	7.50	8.00	10.75	10.75	14.00
7- " " ".....	7.75	9.00	10.50	12.50	12.50	17.00
8- " " ".....	9.00	.....	.....	13.75	13.75	18.50
9- " " ".....	.....	.....	.....	15.00	.....	20.00
Clinker Door and Lining.....	1.00	.50	1.25	1.25	1.00	2.00
Fire Door.....	1.25	1.75	2.25	2.00	2.25	2.75
"    Lining.....	1.00	1.50	2.00	2.00	2.00	2.25
R.-H. Upper C. O. Door and	.....	.....	.....	.....	.....	.....
Lining.....	1.50	1.25	2.25	2.25	3.25	6.75
L.-H. Upper C. O. Door and	.....	.....	.....	.....	.....	.....
Lining.....	1.50	1.25	2.25	2.25	3.25	6.50
R.-H. Lower C. O. Door and	.....	.....	.....	.....	.....	.....
Lining.....	.....	1.00	2.25	2.25	4.00	2.00
L.-H. Lower C. O. Door and	.....	.....	.....	.....	.....	.....
Lining.....	.....	1.00	2.00	2.25	4.00	2.00
Center C. O. Door and Lining.....	.....	.50	.....	.....	.....	.....
Smoke-Hood Damper.....	.50	.50	.50	.75	1.00	1.50
Smoke-Hood, Complete.....	5.50	4.25	9.25	8.00	14.00	8.50

Cotter pins, each net.....

05

\*This size has two clinker doors.



# Sectional Boiler Parts

22, 28, New 36, and 48-inch

## List Prices

Name of Part	19-inch	22-inch	25-inch	28-inch	New 36-inch	48-inch
Fire Door.....	\$ 1.75	\$ 2.00	\$ 2.50	\$ 2.75	\$ 3.75	\$3.00
" " Lining .....	1.00	1.50	1.75	2.00	3.00	* 2.50
Upper C.O. Door, R. or L.....	1.25	1.25	1.50	1.75	3.25	6.75
" " Lining, R. or L.....	.60	.75	1.00	1.50	2.50	5.00
Lower " " R. or L.....						3.25
" " Lining, R. or L.....						3.00
1-Section Base Panel.....	1.50	1.75	1.75	2.00	2.25	5.00
2- " " ".....	2.25	2.75	3.25	3.00	4.00	8.75
5- " " ".....	5.25	5.50	6.25	6.50	9.25	.....
6- " " ".....	6.50	7.25	7.75	8.75	11.75	23.50
7- " " ".....	7.25	8.25	8.50	9.75	14.00	26.50
8- " " ".....		9.25	10.50	10.75	15.00	32.00
Base Front Panel.....	4.50	5.50	7.25	7.75	9.00	16.75
" Back " Lower Half.....	2.50	3.25	4.00	4.00	5.25	8.50
" " " Upper ".....	2.00	3.00	4.00	4.25	7.25	6.00
" Front Door.....	1.75	1.75	2.25	2.25	3.00	3.50
Clinker Door, R. or L.....	1.00	.60	.75	1.00	1.00	1.25
" " Lining, R. or L.....	.60	.40	.40	.60	.60	1.00
Base Butterfly Door.....	.60	.60	.60	.75	1.25	2.25
R.H. Front Half, Conn. Arm, Short.....					1.50	2.25
" " " " Med'm.....		1.00	1.50	1.50	1.75	2.50
" " " " Long.....		1.25	1.75	1.75	2.00	3.00
2-Link L. H. Conn. Arm.....		1.00	1.50	1.25	1.75	.....
2- " R. H. " " Short.....		1.25	1.25	1.50	1.75	1.75
2- " R. H. " " Long.....		1.50	1.50	2.25	.....	.....
3- " L. H. " ".....		1.50	1.75	1.75	2.25	2.25
3- " R. H. " ".....		1.25	1.75	1.75	2.25	2.25
4- " L. H. " ".....	1.50	1.50	2.50	2.25	3.00	3.00
4- " R. H. " ".....					2.75	2.75
5- " L. H. " ".....	1.75				3.25	3.25
6- " L. H. " ".....	2.00					
Grate Bar, R. or L.....	3.25	4.75	7.00	8.50	14.50	21.50
Front Coal Guard.....	1.00	1.50	1.50	1.75	3.00	4.25
Angle Lever.....	.60	.60	1.00	1.00	1.00	1.00
Shaker Handle.....	.75	.75	1.00	1.00	2.00	2.00
Smoke Hood.....	5.50	3.00	7.00	11.00	12.50	26.25
" " Damper.....	.40	.60	.60	.75	1.25	2.75
" " Cover.....	.75	1.00	1.25	1.75	2.50	4.25
" " Check Draft.....	.60	.60	.60	.75	.75	1.50
" " Door Weight.....	.40	.40	.40	.40	.40	.75
" " Lever and Clamp.....		.60	.....	.60	.60	.60
" " Complete.....	7.25	5.50	9.50	14.25	17.00	35.00
Push Nipple, Top.....	4" .60	4" .60	4" .60	4" .60	6" .70	6" .70
" " Bottom.....	2 1/2" .60	3" .60	3" .60	3" .60	4" .60	4" .60
" " Center Front Sec'n.....						3" .60
Front Section, Steam.....	36.00	40.00	57.00	63.00	92.00	*83.00
" " Water.....	32.00	39.00	54.00	59.00	89.00	*78.00
" Flue Conn. Sect'n, Steam.....						*90.00
" " " Water.....						*87.00
Open Center Section, Steam.....	36.00	45.00	56.00	68.00	93.00	*90.00
" " Water.....	34.00	43.00	56.00	64.00	88.00	*83.00
Closed Center " Steam.....	38.00	46.00	59.00	69.00	96.00	*91.00
" " Water.....	35.00	45.00	54.00	66.00	88.00	*82.00
Open Conn. Section, Steam.....	37.00	47.00	57.00	69.00	93.00	*92.00
" " Water.....	36.00	44.00	56.00	66.00	88.00	*87.00
Closed Conn. Section, Steam.....	33.00	48.00	59.00	72.00	99.00	*93.00
" " Water.....	35.00	45.00	57.00	67.00	92.00	*86.00
Rear Center Conn. Sect'n, Steam.....	38.00	47.00	58.00	72.00	98.00	*91.00
" " Water.....	35.00	45.00	56.00	68.00	95.00	*85.00
Back Section, Steam.....	37.00	47.00	59.00	74.00	100.00	*92.00
" " Water.....	35.00	44.00	57.00	68.00	98.00	*86.00

\*48-inch Boilers have right and left castings. Above is price of either one.

# Sectional Boiler Parts

## List Price of Parts to Increase Boiler One Size

Steam			Water		
No.		Price	No.		Price
15-inch.....		\$40.00	15-inch.....		\$ 39.00
18-inch.....		45.00	18-inch.....		42.50
19-inch.....		60.00	19-inch.....		58.00
21-inch.....		70.00	21-inch.....		65.50
22-inch.....		62.50	22-inch.....		61.00
24-inch.....		72.50	24-inch.....		70.00
25-inch.....		80.00	25-inch.....		78.00
28-inch.....		102.00	28-inch.....		100.00
30-inch.....		115.00	30-inch.....		105.00
36-inch N. S.....		130.00	36-inch N. S.....		130.00
36-inch O. S.....		150.00	36-inch O. S.....		135.00
48-inch.....		180.00	48-inch.....		170.00

### Arrangement of Sections

A—Front Section; B—Back Section; C—Closed Front Flue Connecting; D—Open Front Flue Connecting; E—Open Center; F—Closed Center; G—Open Connecting; H—Closed Connecting; J—Rear Connecting; K—Half Open Center; L—Half Open Connecting; M—Closed 4 Flue Center; O—Closed 5 Flue Center; P—Rear Center.

S-15-4-A-D-J-B  
S-15-5-A-C-E-J-B  
S-15-6-A-C-K-E-J-B

W-15-4-A-C-G-B  
W-15-5-A-C-K-G-B  
W-15-6-A-C-F-K-G-B

S-19-5-A-G-E-J-B  
S-19-6-A-H-E-E-J-B  
S-19-7-A-H-F-G-E-J-B

W-19-5-A-G-E-J-B  
W-19-6-A-H-E-E-J-B  
W-19-7-A-H-F-G-E-J-B

S-22-5-A-G-E-J-B  
S-22-6-A-H-E-E-J-B  
S-22-7-A-H-F-G-E-J-B

W-22-5-A-G-E-J-B  
W-22-6-A-H-E-E-J-B  
W-22-7-A-H-F-G-E-J-B  
S-25-5-A-G-E-J-B  
S-25-6-A-H-E-E-J-B  
S-25-7-A-H-F-G-E-J-B  
S-25-8-A-H-F-F-G-E-J-B  
W-25-5-A-G-E-J-B  
W-25-6-A-H-E-E-J-B  
W-25-7-A-H-F-G-E-J-B  
W-25-8-A-H-F-F-G-E-J-B  
S-28-5-A-G-E-J-B  
S-28-6-A-H-E-E-J-B  
S-28-7-A-H-F-G-E-J-B  
S-28-8-A-H-F-F-G-E-J-B  
W-28-5-A-G-E-J-B  
W-28-6-A-H-E-E-J-B  
W-28-7-A-H-F-G-E-J-B  
W-28-8-A-H-F-F-G-E-J-B

For List Price of Sections see pages 198 and 199. Sections not listed on those pages will be billed as follows: C and D as Front Flue Connecting; E, F, and K, as Center Sections; and G, H, and L as Center Connecting Sections.



# Sectional Boiler Parts

## Arrangement of Sections—Continued

S-36-5-A-G-E-J-B	S-48-6*-A-C-E-G-P-B
S-36-6-A-H-E-E-J-B	S-48-7*-A-C-F-E-G-P-B
S-36-7-A-H-F-G-E-J-B	S-48-8*-A-C-F-H-E-G-P-B
S-36-8-A-H-F-F-G-E-J-B	S-48-9*-A-C-F-F-H-E-G-P-B
S-36-9-A-H-F-H-E-G-E-J-B	S-48-10*-A-C-F-F-H-E-E-G-P-B
W-36-5-A-G-E-J-B	W-48-6*-A-C-E-E-J-B
W-36-6-A-H-E-E-J-B	W-48-7*-A-C-F-E-E-J-B
W-36-7-A-H-F-G-E-J-B	W-48-8*-A-C-F-F-G-E-J-B
W-36-8-A-H-F-F-G-E-J-B	W-48-9*-A-C-F-F-G-E-E-J-B
W-36-9-A-H-F-H-E-G-E-J-B	W-48-10*-A-C-F-F-F-G-E-E-J-B

For List Price of Sections see pages 198 and 199. Sections not listed are priced as follows: C and D as Front Flue Connecting, M and O as Center Sections, and G and H as Center Connecting Sections when not listed.

\*48-inch Boilers have double Sections.

## Arrangement of Grate Bars and Connecting Arms

Boiler No.	Left-Hand Grate Bars	Right-Hand Grate Bars	Size Right-Hand Connecting Arm	Boiler No.	Left-Hand Grate Bars	Right-Hand Grate Bars	Size Right-Hand Connecting Arm
S- or W-15-4	3	...	.....	S- or W-28-6	3	2	Medium
S- or W-15-5	4	...	.. . . .	S- or W-28-7	3	3	"
S- or W-15-6	5	...	.....	S- or W-28-8	4	3	Long
S- or W-19-5	4	...	.....	S- or W-36-5	2	2	Short
S- or W-19-6	5	...	.. . . .	S- or W-36-6	3	2	Medium
S- or W-19-7	6	...	.....	S- or W-36-7	3	3	"
S- or W-22-5	2	2	.. . . .	S- or W-36-8	4	3	Long
S- or W-22-6	3	2	.....	S- or W-36-9	4	4	"
S- or W-22-7	3	3	Medium	S- or W-48-6	3	2	Short
S- or W-25-5	2	2	.....	S- or W-48-7	3	3	"
S- or W-25-6	3	2	Medium	S- or W-48-8	4	3	Medium
S- or W-25-7	3	3	"	S- or W-48-9	4	4	"
S- or W-25-8	4	3	Long	S- or W-48-10	5	4	Long
S- or W-28-5	2	2	.....				

## 2 Round Boiler Parts

For 1908 Premier Steam and Water Boilers

### List Prices

Name of Part	15-in.	18-in.	21-in.	24-in.	27-in.
New Premier Base Casting	\$11.00	\$14.50	\$17.50	\$19.50	\$22.50
Base Front Frame	2.25	2.25	2.50	2.50	3.25
Base Door	1.25	1.25	1.50	1.50	1.50
Base Butterfly Door	.50	.50	.50	.50	.75
Front Grate Bar	1.00	1.50	1.75	2.25	2.50
Center Grate Bar	1.25	1.75	2.75	3.00	3.50
Back Grate Bar	1.00	1.50	1.75	2.25	2.50
Connecting Bar	.50	.75	.75	1.00	1.00
Connecting Arm	.50	.50	.50	.50	.60
Angle Lever	.60	.60	.60	.60	.75
Shaker Handle	.75	.75	.75	.75	.75
Base Complete	20.00	25.00	30.00	35.00	43.00
Firepot	35.00	48.00	60.00	72.00	85.00
Fire Door Frame	1.50	1.50	1.75	1.75	1.75
Fire Door and Lining	1.50	1.75	2.00	2.25	2.50
Clinker Door Frame	.75	.75	.75	.75	1.00
Clinker Door and Lining	.60	.60	.75	.75	.75
Clean-Out Door Frame	.75	.75	1.00	1.25	1.50
Clean-Out Door and Lining	.75	.75	.75	.75	.75
Clean-Out Panel	.75	.75	1.00	1.00	1.25
Three-Flue Section	8.50	11.00	15.00	18.00	22.00
Two-Flue Section	8.25	10.00	14.00	17.00	21.50
Steam Dome	23.00	28.00	33.00	41.00	47.00
Water Dome	13.00	15.00	19.00	23.00	31.00
Smoke Hood, Top Half	1.00	1.00	1.50	1.50	2.50
Smoke Hood, Bottom Half	1.50	1.50	1.50	1.50	3.00
Smoke Hood Damper	.50	.50	.75	.75	.75
Smoke Hood Ch'k Draft Door	.40	.40	.50	.50	.50
Smoke Hood Complete	3.00	3.00	4.00	4.00	6.25
Push Nipple	4" .60	5" .60	6" .70	6" .70	6" .70

## For Junior Steam and Water Boilers

### List Prices

Name of Part	15-in.	18-in.
Base Casting	\$13.25	\$14.25
Base Top Ring	2.25	2.75
Base Front Frame	2.00	2.00
Base Door	1.00	1.00
Base Butterfly Door	.50	.50
Front Grate Bar	1.25	1.50
Center Grate Bar	1.50	2.00
Back Grate Bar	1.25	1.50
Connecting Bar	.60	.60
Connecting Arm	.60	.60
Angle Lever	.60	.60
Shaker Handle	1.00	1.00
Firepot	49.00	64.00
Clinker Door Frame	.60	.60
Clinker Door and Lining	.40	.40
Fire Door Frame	1.75	1.75
Fire Door and Lining	1.00	1.00
Section Ring Complete	2.25	2.25
Intermediate Section	6.50	12.50
Steam Dome	21.00	28.00
Water Dome	12.50	18.00
Smoke Hood Complete	2.50	3.50
Screw Nipple	5" 1.50	5" 1.50

# Water Heater Parts

For Premier Junior Tank Heaters

List Prices

Name of Part	10-inch	12-inch	15-inch	18-inch
Base Casting.....	\$3.50	\$9.50	\$13.25	\$14.25
" Front Frame.....		1.75	2.00	2.00
" Door.....	.60	1.00	1.00	1.00
" Door Slide Damper.....	.40			
" Shaker Door.....	.40			
" Butterfly Door.....		.40	.50	.50
" Top Ring.....			2.25	2.75
Grate Ring.....		2.00		
" for Center Slide.....	1.00			
" Center Slide.....	.40			
Front Grate Bar.....		1.00	1.25	1.50
Center ".....			1.50	2.00
Back ".....		1.00	1.25	1.50
Connecting ".....		.40	.60	.60
Connecting Arm.....		.40	.60	.60
Angle Lever.....		.60	.60	.60
Shaker Handle.....	.40	.75	1.00	1.00
Fire Pot.....	21.00	35.00	47.00	66.00
" Door Frame.....	.75	1.50	1.50	1.50
" Door.....	.60	.75	.75	.75
" Pot Ring.....	1.00	1.25	1.25	2.00
Clinker Door Frame.....	.60	.60	.60	.60
" and Lining.....	.40	.40	.60	.60
Section Ring, Complete.....		1.25	2.00	2.25
Deflector Damper, Complete.....			.75	.75
Water Dome.....		10.50	12.50	18.00
Smoke Hood, Complete.....	1.00	1.75	3.25	3.25
Screw Nipple.....		4" 1.25	5" 1.50	5" 1.50

For Laundry and Tank Heaters

List Prices

Name of Part	1—D	1—C	1—A	2	3
Base Legs, each.....	\$0.25	\$0.25	\$.....	\$.....	\$.....
" Casting.....	3.50	3.50			
" Bottom.....	2.00	2.00	2.50	3.50	4.00
" Panels, each.....			.75	1.00	1.25
" Top Ring.....			2.00	2.75	4.00
" Front Frame.....			.75	.75	1.25
" Door.....	.60	.60	.60	.75	1.25
" Door Slide Damper.....	.40	.40			
" Shaker Door.....	.40	.40			
" Butterfly Door.....			.40	.40	.40
Circular Slide Grate.....	1.00	1.00			
Grate Center Slide.....	.40	.40			
Front Grate Bar.....			.75	1.00	1.00
Shaker Grate Bar.....			1.00	1.25	1.50
Back ".....					1.00
Connecting Bar.....			.40	.40	.40
Shaker Handle.....	.40	.40	.40	.40	.40
Firepot.....	9.75	9.75	6.25	11.50	13.50
Combustion Rings, each.....	1.50	1.50			
Flat-Iron Rest.....			3.25	3.75	4.00
Fire Door.....	.75		.40	.40	.40
Laundry Sub-Top.....	3.25	4.00	2.50	3.00	3.25
" Top.....	2.75	3.00	2.50	3.00	3.25
Flue Strip.....	.75	1.00	.75	1.00	1.00
Top Covers, each.....	.40	.40	.40	.40	.40
Top Center.....	.40	.40	.40	.40	.40

# Steam Boiler Trimmings

Used on all Boilers except 48-inch Sectional

Water Column.....	\$2.00	Diaphragm Lever.....	\$ .50
$\frac{1}{2}$ -inch Try Cocks, each.	1.00	Diaphragm Weights, each	.60
Two $\frac{1}{2}$ -in. Gauge Cocks,		Diaphragm Rubbers, 7-in	.75
each.....	1.25	Pipe and Fittings.....	2.00
Glass.....	.40	9-ft. Jack Chain.....	.40
Guards, per set.....	.40	12-ft. Jack Chain.....	.50
Diaphragm Trap.....	1.50	18-ft. Jack Chain.....	.75
Diaphragm Bracket.....	.40	$\frac{1}{4}$ -inch Pet Cock.....	.60
Diaphragm Plunger.....	.40	$\frac{1}{8}$ -inch Pet Cock.....	.60

**FOR  $\frac{1}{2}$ -INCH STEAM GAUGE: IDEAL SYLPHON REGULATOR AND POP SAFETY VALVE:** See Specialty List and Discount.

**TRY COCKS:** All Round and Sectional Boilers have two Try Cocks. Prior to adopting Water Columns cast on front section, 30- and 36-inch Sectional Boilers had three Try Cocks.

**DIAPHRAGM WEIGHTS:** On 24-, 28-, 30-, and 36-inch Sectional Boilers the Cast-Iron Diaphragm Damper Regulator is supplied with two weights; all other Boilers have only one weight.

**POP SAFETY VALVES:** Our Steam Boilers are regularly supplied as follows:

$\frac{3}{4}$ -inch valve on 15-inch Premier.

1-inch valve on 18-, 19-, 21-, and 22-inch Round Boilers, 15- to 19-inch Sectional, and No. 2 and No. 3 Series Coke Boilers.

$1\frac{1}{4}$ -inch valve on 24- to 28-inch Round Boilers, 21- to 30-inch Sectional, and No. 4 Series Coke Boilers.

$1\frac{1}{2}$ -inch valve on 30- to 36-inch Round Boilers, 36-inch Sectional, and No. 5 Series Coke Boilers.

2-inch valve on 48-inch Sectional Boilers.

**JACK CHAIN:** Our Steam Boilers are supplied with the following lengths of Jack Chain:—

9 feet on 15- and 18-inch Premier and all Coke Boilers.

12 feet on Portable, Invincible, and Arco Boilers.

18 feet on 21- to 32-inch Premier and all Sectional Boilers.

**PET COCKS:** Sectional Steam Boilers are supplied with one  $\frac{1}{4}$ -inch Pet Cock and all Round Steam Boilers are supplied with one  $\frac{1}{4}$ -inch and one  $\frac{1}{8}$ -inch Pet Cock. The  $\frac{1}{4}$ -inch Pet Cocks form part of the lower Gauge Cock and the  $\frac{1}{8}$ -inch Pet Cocks on Round Boilers go on bottom of Water Column.

## For 48-inch Sectional Boilers Only

Water Column.....	\$3.75
Three $\frac{1}{2}$ -inch Try Cocks, each.....	1.25
Two $\frac{3}{4}$ -inch Gauge Cocks, each.....	3.50
Glass.....	.40
Guards, per set.....	.40
Pipe and Fittings.....	2.50
18-foot Jack Chain.....	.75
One $\frac{1}{8}$ -inch Cock.....	.60
One 6-inch Steam Gauge.....	9.00



# Boiler Sundries, Fire Tools, Etc.

## Flue Brushes

No. 1904, $4\frac{1}{2}$ x 4 x $1\frac{3}{4}$ inches. Used on all Round except Premier Boilers and on Sectional Boilers to 36-inch Grate.....	\$1.00
Export, 6 x $4\frac{1}{2}$ x $2\frac{3}{4}$ inches. Used on New 36- and 48-inch Sectional Boilers.....	3.00
Oval, $2\frac{3}{4}$ x 4 x 1 inch. Used on Premier Boilers.....	1.00
Round Brushes 2, $2\frac{1}{2}$ , 3, or 4 inches diameter for Fire-Box Boilers.....	1.00

## Brush Handle

Round Boilers.....	\$ .75
All Sectional except 48-inch.....	1.00
48-inch Sectional.....	1.50

## Poker

Round Boilers, 15- to 28-inch Grate.....	\$ .75
Round Boilers, 30- to 36-inch Grate.....	1.25
Sectional, to 36-inch.....	1.25
36- to 48-inch Sectional.....	2.00

## Scraper

Round Boilers.....	\$ .75
48-inch Sectional Boilers.....	1.25

## Slice Bar

Sectional, to 30-inch inclusive.....	\$1.25
36-inch Sectional.....	1.75
48-inch Sectional.....	2.75

## Hoe and Handle

Sectional, to 28-inch.....	\$ .75
30- to 48-inch Sectional.....	1.75

## Boiler Putty

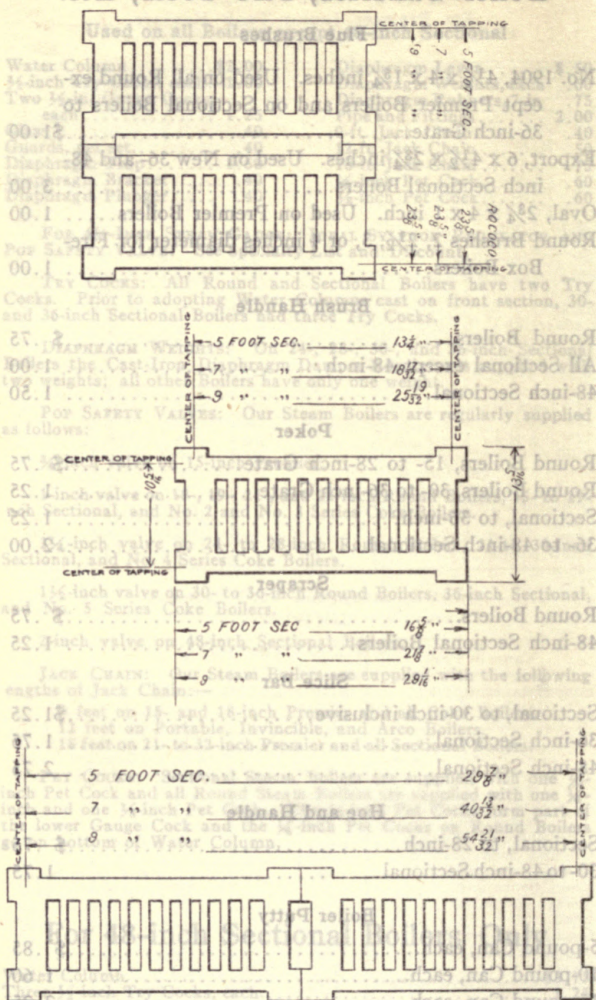
5-pound Can, each.....	\$ .85
10-pound Can, each.....	1.60
15-pound Can, each.....	2.25

## Blow-Off Cock

$\frac{3}{4}$ -inch Angle Blow-Off Cock, each.....	\$1.75
1-inch Angle Blow-Off Cock, each.....	2.25



# Wall-Radiator Measurements



American Wall Radiators are tapped  $1\frac{1}{2}$  inches supply and return, and unless otherwise ordered, will be bushed according to regular tapping list on page 105. See also, "Directions for Ordering," page 108.

# Wall Radiators—Continued

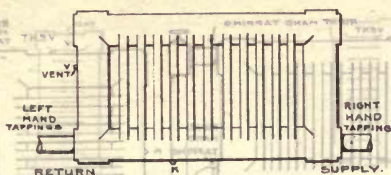


Fig. 3  
One- and Two-Pipe Steam

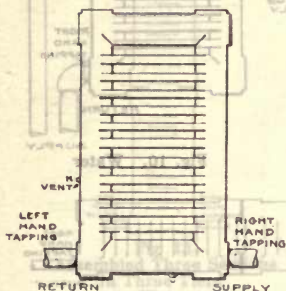


Fig. 4  
One- and Two-Pipe Steam

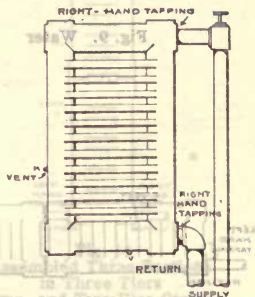


Fig. 6  
One- and Two-Pipe Steam

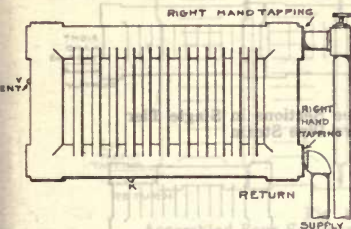


Fig. 5  
One- and Two-Pipe Steam

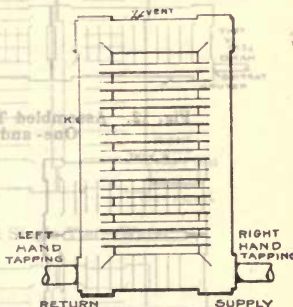


Fig. 8—Water

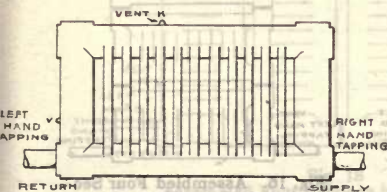


Fig. 7—Water

# Wall Radiators—Continued

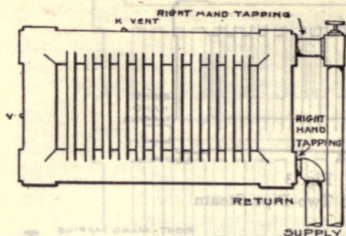


Fig. 9. Water

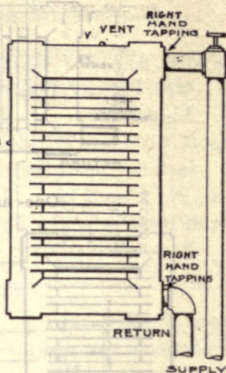


Fig. 10. Water

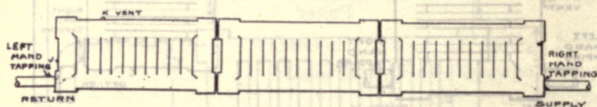


Fig. 11. Assembled Three Sections in Single Tier—Water

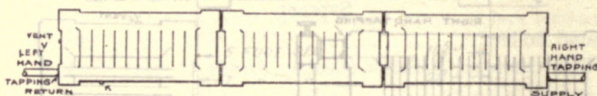


Fig. 12. Assembled Three Sections in Single Tier  
One- and Two-Pipe Steam

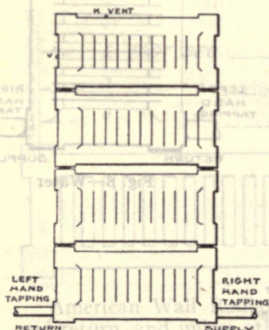


Fig. 15. Assembled Four  
Sections in Four Tiers  
Water

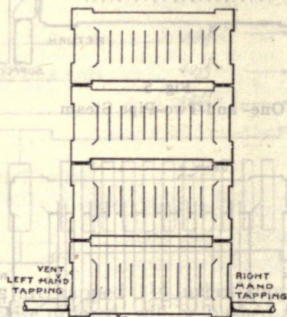
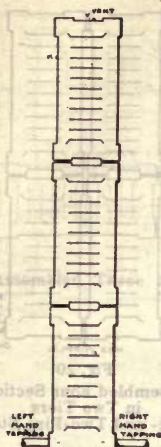
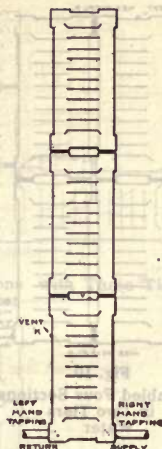


Fig. 16. Assembled Four Sections in Four Tiers—One-  
and Two-Pipe Steam

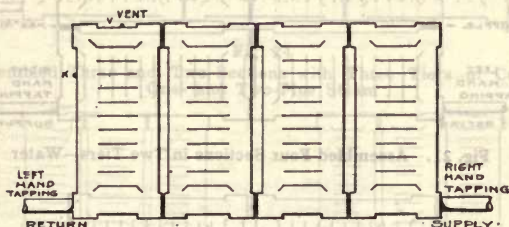
# Wall Radiators—Continued



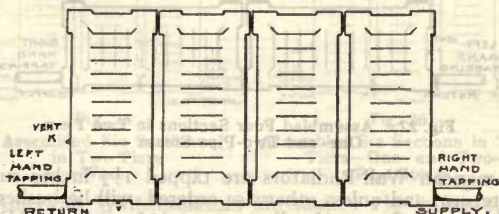
**Fig 13**  
Assembled Three Sections  
in Three Tiers  
Water



**Fig 14**  
Assembled Three Sections  
in Three Tiers  
One- and Two-Pipe Steam



**Fig 17**  
Assembled Four Sections in Single Tier—Water



**Fig 18**  
Assembled Four Sections in Single Tier  
One- and Two- Pipe Steam



## Wall Radiators—Continued

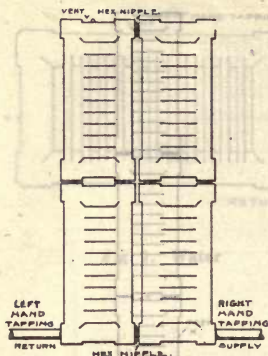


Fig. 19

Assembled Four Sections  
in Two Tiers  
Water

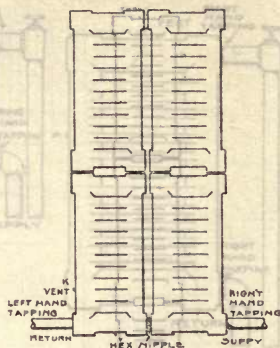


Fig. 20

Assembled Four Sections  
in Two Tiers  
One- and Two-Pipe Steam

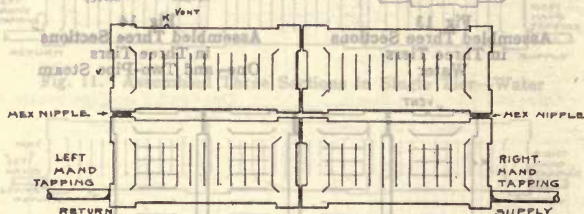


Fig. 21. Assembled Four Sections in Two Tiers—Water

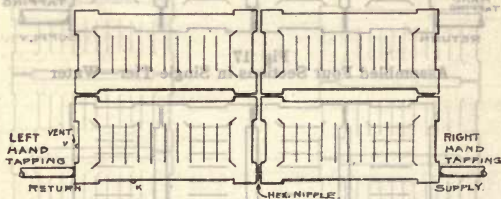


Fig. 22. Assembled Four Sections in Two Tiers  
One- and Two-Pipe Steam

American Wall Radiators are tapped  $1\frac{1}{2}$  inches supply and return, and unless otherwise ordered, will be bushed according to regular tapping list on page 105. See also "Directions for Ordering," page 108. Tappings other than those illustrated will be charged extra—10 cents each, net.



## Wall Radiators—Continued

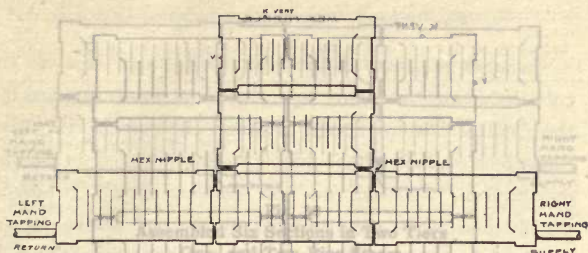


Fig. 23

Assembled Three and Two Sections with Three Tiers in Center—Water

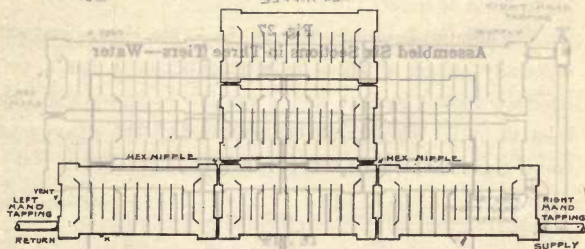


Fig. 24

Assembled Three and Two Sections with Three Tiers in Center. One- and Two-Pipe Steam

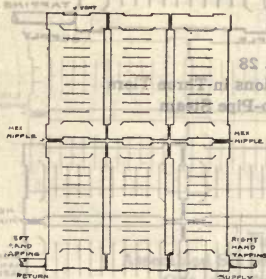


Fig. 25

Assembled Six Sections in Two Tiers Water

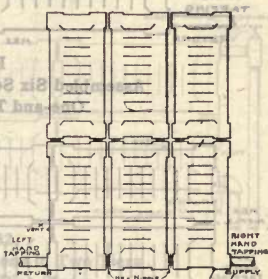


Fig. 26

Assembled Six Sections in Two Tiers—One- and Two-Pipe Steam

American Wall Radiators are tapped  $1\frac{1}{2}$  inches supply and return, and unless otherwise ordered, will be bushed according to regular tapping list on page 105. See also "Directions for Ordering," page 108.

## Wall Radiators—Continued

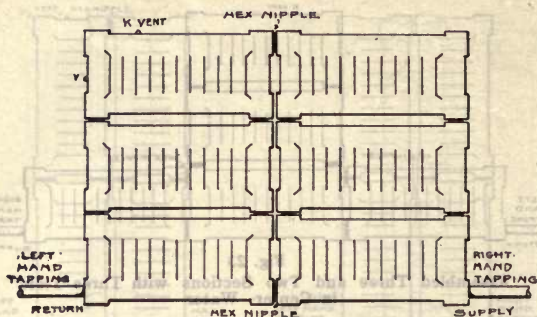


Fig. 27  
Assembled Six Sections in Three Tiers—Water

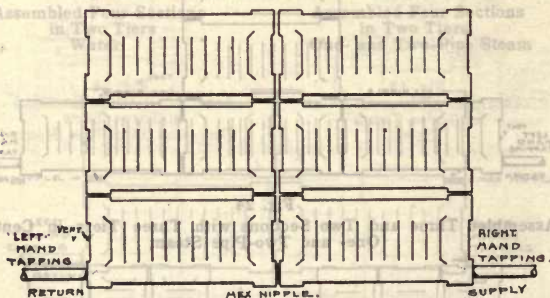


Fig. 28  
Assembled Six Sections in Three Tiers  
One-and Two-Pipe Steam

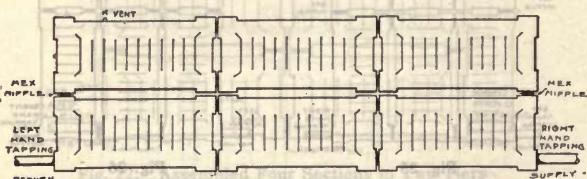
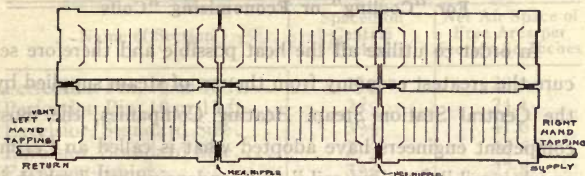


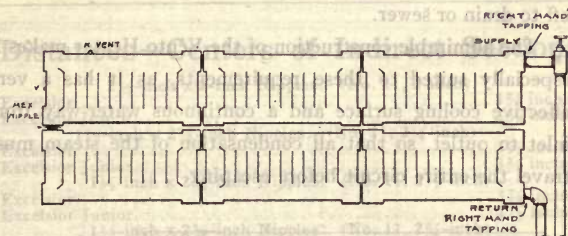
Fig. 29  
Assembled Six Sections in Two Tiers—Water

American Wall Radiators are tapped  $1\frac{1}{2}$  inches supply and return, and unless otherwise ordered, will be bushed according to regular tapping list on page 105. See also "Directions for Ordering," page 108.

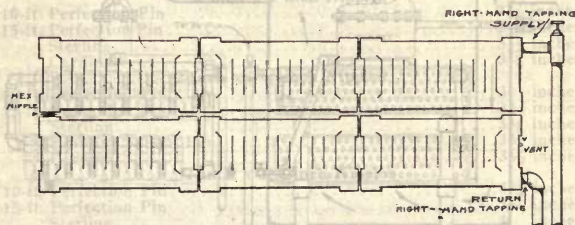
## Wall Radiators—Continued



**Fig. 30**  
Assembled Six Sections in Two Tiers  
One- and Two-Pipe Steam



**Fig. 31**  
Assembled Six Sections in Two Tiers—Water



**Fig. 32**  
Assembled Six Sections in Two Tiers  
One- and Two-Pipe Steam

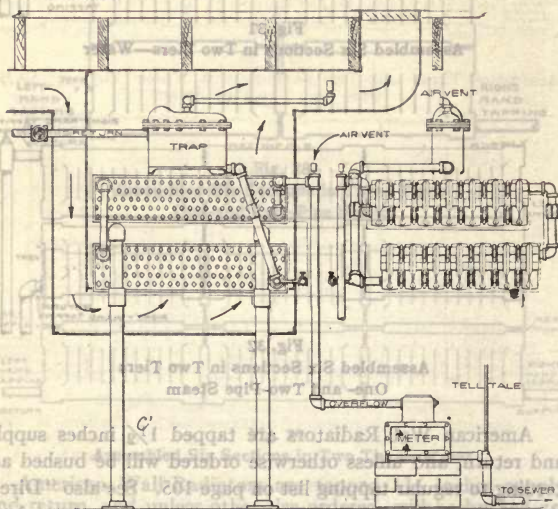
American Wall Radiators are tapped  $1\frac{1}{2}$  inches supply and return, and unless otherwise ordered will be bushed according to regular tapping list on page 105. See also "Directions for Ordering," page 108. Tappings other than those illustrated will be charged extra—10 cents each, net.

# Vento Cast-Iron Hot-Blast Heater

## For "Cooling" or Economizing "Coils"

In order to utilize all the heat possible and therefore secure the greatest economy from the use of steam supplied by the Central Station Steam Heating Companies, the most competent engineers have adopted what is called an "economizing coil," "cooling coil," or "condensing coil," which is usually located in the basement at the end of the return main. All of the water of condensation must pass through this "economizing coil" and give up its heat before passing off to drain or sewer.

The admirable construction of the Vento Heater makes it especially suited to these requirements, as it has a very effective cooling surface and a continuous water-way from inlet to outlet, so that all condensation of the steam must travel the entire circuit before escaping.



Showing side and end views of Vento Sections used for economizing; also necessary equipment and connections



## Free Area between Indirect Sections

Name of Section	Spaced on Centers Inches	Net Air Space of Free Area per Section, Sq. Inches
Perfection Pin, 10 or 15 ft.	23 $\frac{3}{4}$	20.1
Perfection Pin, 10 or 15 ft.	27 $\frac{7}{8}$	24.1
Excelsior, Standard Size.	33 $\frac{3}{8}$	41.6
Excelsior, Standard Size.	31 $\frac{1}{2}$	45.6
Excelsior Junior	33 $\frac{3}{8}$	27.8
Excelsior Junior	31 $\frac{1}{2}$	30.5
Sanitary Pin	4	37.3
Sanitary Pin	48 $\frac{8}{16}$	43.3
Sterling	31 $\frac{1}{2}$	39.0
Cardinal	31 $\frac{1}{2}$	31.8

## Distances—Centers of Indirect Sections

### 1 $\frac{1}{2}$ -inch x 2-inch Nipples. (No. 11, 2-inch)

Excelsior	33 $\frac{3}{8}$ inches
Excelsior Junior	33 $\frac{3}{8}$ inches

### 1 $\frac{1}{2}$ -inch x 2 $\frac{1}{4}$ -inch Nipples. (No. 11, 2 $\frac{1}{4}$ -inch)

Excelsior	35 $\frac{5}{8}$ inches
Excelsior Junior	35 $\frac{5}{8}$ inches

### 1 $\frac{1}{2}$ -inch x 2 $\frac{1}{2}$ -inch Nipples. (No. 11, 2 $\frac{1}{2}$ -inch)

Excelsior	37 $\frac{7}{8}$ inches
Excelsior Junior	37 $\frac{7}{8}$ inches

### 1 $\frac{1}{2}$ -inch x 2 $\frac{3}{4}$ -inch Nipples. (No. 11, 2 $\frac{3}{4}$ -inch)

Excelsior	41 $\frac{1}{8}$ inches
Excelsior Junior	41 $\frac{1}{8}$ inches

### 1 $\frac{1}{2}$ -inch x 3-inch Nipples. (No. 11, 3-inch)

Excelsior	43 $\frac{3}{8}$ inches
Excelsior Junior	43 $\frac{3}{8}$ inches

### 2-inch x 2-inch Nipples

10-ft. Perfection Pin	23 $\frac{3}{4}$ inches
15-ft. Perfection Pin	27 $\frac{7}{8}$ inches
Sterling	31 $\frac{1}{2}$ inches
Cardinal	31 $\frac{1}{2}$ inches

### 2-inch x 2 $\frac{1}{4}$ -inch Nipples

10-ft. Perfection Pin	31 inches
15-ft. Perfection Pin	31 $\frac{1}{8}$ inches
Sterling	33 $\frac{3}{4}$ inches
Sanitary School Pin	33 $\frac{3}{4}$ inches
Cardinal	31 $\frac{1}{2}$ inches

### 2-inch x 2 $\frac{1}{2}$ -inch Nipples

10-ft. Perfection Pin	31 $\frac{1}{4}$ inches
15-ft. Perfection Pin	33 $\frac{3}{8}$ inches
Sterling	4 inches
Sanitary School Pin	4 inches
Cardinal	33 $\frac{3}{4}$ inches

### 2-inch x 2 $\frac{3}{4}$ -inch Nipples

10-ft. Perfection Pin	31 $\frac{1}{2}$ inches
15-ft. Perfection Pin	35 $\frac{5}{8}$ inches
Sterling	41 $\frac{1}{4}$ inches
Sanitary School Pin	41 $\frac{1}{4}$ inches
Cardinal	4 inches

### 2-inch x 3-inch Nipples

10-ft. Perfection Pin	33 $\frac{3}{4}$ inches
15-ft. Perfection Pin	37 $\frac{7}{8}$ inches
Sterling	41 $\frac{1}{2}$ inches
Sanitary School Pin	41 $\frac{1}{2}$ inches
Cardinal	41 $\frac{1}{4}$ inches



# Table to Determine the Water-Heating or Tank Capacities of any Ideal Heating Boiler

When the specifications for tank heating are greater than the regular Water-Heater capacity will cover, a house-heating Boiler may be used by employing the following rule: Multiply the specified quantity of water in U. S. gallons to be heated by the factor in body of table, which coincides with the desired rise in temperature per hour and the time Boiler must run on one fuel charge, and the result will be the catalogue rating of proper size IDEAL Boiler to be used.

Boiler will run on one charge of fuel hours .....		6	7	8	9	10	11	12
Temperature rise Fahrenheit degrees per hour	20 .....	.71	.82	.94	1.06	1.17	1.29	1.41
	30 .....	1.06	1.23	1.41	1.49	1.76	1.93	2.11
	40 .....	1.41	1.65	1.88	2.12	2.35	2.59	2.82
	50 .....	1.76	2.05	2.35	2.65	2.94	3.23	3.53
	60 .....	2.12	2.47	2.82	3.17	3.52	3.88	4.23
	70 .....	2.47	2.88	3.29	3.70	4.11	4.52	4.94
	80 .....	2.82	3.29	3.76	4.23	4.70	5.17	5.64
	90 .....	3.17	3.70	4.23	4.76	5.30	5.82	6.35
	100 .....	3.52	4.11	4.70	5.30	5.88	6.46	7.06
	110 .....	3.87	4.52	5.17	5.82	6.46	7.10	7.75
	120 .....	4.24	4.95	5.65	6.36	7.06	7.78	8.48
	130 .....	4.57	5.34	6.10	6.86	7.62	8.40	9.15
	140 .....	4.93	5.76	6.58	7.40	8.22	9.05	9.88
	150 .....	5.29	6.17	7.05	7.93	8.82	9.70	10.06
	160 .....	5.64	6.58	7.52	8.46	9.40	10.35	11.30
	170 .....	6.00	7.00	8.00	9.00	10.00	11.00	12.00

The use of the above table is possible only when the Boiler ratings are based on the exact Boiler power, and the exact power can be determined only by accurate tests of each and every Boiler. IDEAL Boilers are the only boilers in the world that are so rated, and therefore the power expressed in radiation may be used for the purpose of computing the water-heating power under any given set of conditions, or vice versa. The following examples will make the foregoing statement clear:—

## Table to Determine the Water-Heating or Tank Capacities of any Ideal Heating Boiler—Cont.

*Example 1.*—80 degrees Fahrenheit must be added per hour to 500 gallons of water contained in a 500-gallon storage tank. The heater must run eight hours on one charge of fuel. Look in the table (page 216) opposite 80 degrees and under eight hours, and find the factor 3.76. Multiply 500 gallons by 3.76 and the product is 1,880 square feet of water-boiler capacity. Turn to Graded Ratings on pages 10 and 11 and find that the nearest capacity is 1,950 square feet, which is No. 31-4-W Standard.

If the Boiler for above installation must run twelve hours on one fuel charge, a Boiler 50 per cent larger must be selected. Opposite 80 degrees and under twelve hours is the factor 5.64, and  $500 \times 5.64$  is 2,820 square feet capacity.

*Example 2.*—It is required to add 120 degrees to 1,200 gallons of water every four hours, the Boiler to run eight hours without attention, on one fuel charge. What capacity of Boiler in square feet of radiation should be selected? Turn to the table and find opposite 120 degrees temperature rise, and under eight hours the factor 5.65. Multiply 1,200 gallons by 5.65, which gives a capacity of 6,780 square feet, which is the Boiler capacity if the work must be done in *one hour*; but as there are four hours in which to do the work, we divide 6,780 by 4, and find the required capacity is 1,695 square feet.

Now turn to Graded Ratings on pages 10 and 11, where will be found five different Boilers of about 1,700 feet capacity. If on this job the Boiler must run on one fuel charge for twelve hours without attention, a Boiler of 50% more capacity must be selected. Under the hour twelve is the factor 8.48; the procedure is  $\frac{1,200 \times 8.48}{4} = 2,544$  square feet capacity.

*Example 3.*—What size Boiler must be used to heat 1,500 gallons of water from 60 to 160 degrees Fahrenheit in four hours, the Boiler to run nine hours on one fuel charge of hard coal? The factor opposite 100 and under 9 is 5.30. Then  $1,500 \times 5.30$  gives a Boiler capacity of 7,950 square feet if the work is done in *one hour*; but since there are four hours, divide 7,950 by 4, which gives the approximate capacity of 1,990 square feet.

If soft coal is used, see paragraph on soft coal, page 231.

# Water Heater Ratings

## How to Select the Right Size Heater

(From Tables Pages 219 to 227)

For residence hot-water supply, actual practice has proven that a Heater which will impart from 25 to 30 degrees per hour to the water in the Storage Tank is sufficiently large.

For apartment demands which are proportionately heavier, a Heater which will impart from 40 to 45 degrees of heat per hour is usually large enough.

These capacities are printed in bold face in the eight-hour column in the following tables.

By referring to the first lines in each of the tables which follow, you will find item "1—Hours." This shows different firing periods, and the figures under each heading show conditions and results obtained from feeding the Heater full once in five hours, six hours, and so on up to once in twelve hours. Hard coal is the basis, because its heating power is constant.

Now, take for example, that eight hours is the natural firing period, and a fitter has a demand for a Heater for a residence Storage Tank, where the need is to raise the water 30 degrees per hour, and which calls for 120 gallons per hour: The fitter runs his eye down the column under "eight" hours till he comes to the line which has 120 opposite 30 degrees "temperature rise," and finds the 101 Premier Junior Heater to be the one which will furnish the service. The No. 12 Arco will furnish the same amount—either Heater will answer.

If the Heater is to be fired but once every twelve hours, and the gallon demand and temperature rise are to be the same (30 degrees per hour for 120 gallons) the fitter would run his eye down the columns headed by 12—watching the 30-degree line at left—he would find a No. 122 Premier Junior Heater (128 gallons) has the right capacity.

It is, however, for the plumber or heating contractor, who alone is familiar with all the conditions and requirements, to select from the tables the capacity of Heater needed for each specific installation. The tables are equally applicable to the heating of water for special requirements, as swimming-pools, bottle-washing vats, and other purposes.



# Water Heater Ratings

## No. 10 Ideal Arco Water Heater

Heater's total potential energy, 136,000 British thermal units

1—Hours .....	5	6	7	8	9	10	11	12
2—Hard coal* per hr., lbs.	4.00	3.33	2.86	2.50	2.22	2.00	1.82	1.66
3—Power per hr., B. t. u.	27200	22666	19428	17000	15111	13600	12363	11333
4—Radiation, sq. ft. ....	153	128	110	96	85	76	69	64

### Capacity in U. S. Gallons per hour

Temperature rise Fahrenheit degrees per hour	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
	130	108	93	81	72	65	59	54	49	45	38	34	30	27	24	23
	108	90	77	68	60	54	49	45	42	38	34	30	27	24	21	20
	92	77	66	58	51	46	42	38	34	30	27	25	23	21	20	19
	82	68	59	51	46	41	37	34	30	27	25	23	21	20	19	17
	72	60	51	45	40	36	33	30	27	25	23	21	20	19	17	16
	65	53	46	40	36	32	29	26	24	22	20	18	17	16	15	14
	58	48	41	36	32	29	26	24	22	20	19	17	16	15	14	13
	54	45	39	34	30	27	25	23	21	20	19	17	16	15	14	13
	50	42	36	31	28	25	23	21	20	19	17	16	15	14	13	12
	46	38	33	29	26	23	21	20	19	17	16	15	14	13	12	11
	44	37	31	28	24	22	20	19	17	16	15	14	13	12	11	10
	40	33	29	25	22	20	18	17	16	15	14	13	12	11	10	9
	38	32	27	24	21	19	17	16	15	14	13	12	11	10	9	8
	36	30	26	22	20	18	16	15	14	13	12	11	10	9	8	7
	34	28	24	21	19	17	16	15	14	13	12	11	10	9	8	7
	32	27	23	20	18	16	14	13	12	11	10	9	8	7	6	5

## No. 0 Ideal Junior Water Heater

Heater's total potential energy, 154,000 British thermal units

1—Hours .....	5	6	7	8	9	10	11	12
2—Hard coal* per hr., lbs.	4.40	3.66	3.14	2.75	2.45	2.20	2.00	1.83
3—Power per hr., B. t. u.	30800	25666	22000	19250	17111	15400	14000	12833
4—Radiation, sq. ft. ....	174	145	124	109	96	87	79	72

### Capacity in U. S. Gallons per hour

Temperature rise Fahrenheit Degrees per hour	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
	148	124	106	93	82	74	67	62	56	51	44	39	34	30	27	25
	123	103	88	77	68	62	56	51	46	42	37	34	31	28	26	24
	106	88	75	66	58	51	46	42	38	34	30	27	25	23	21	20
	92	77	66	58	51	46	42	38	34	31	28	26	24	22	20	19
	83	69	59	52	46	41	37	34	31	28	26	24	22	20	19	17
	74	62	53	46	41	37	34	31	28	26	24	22	20	19	17	16
	67	56	48	42	37	34	31	28	26	24	22	20	19	17	16	15
	62	51	44	39	34	31	28	26	24	22	20	19	17	16	15	14
	57	48	41	36	32	29	26	24	22	20	19	17	16	15	14	13
	53	44	38	33	30	27	24	22	20	19	17	16	15	14	13	12
	49	41	35	31	27	25	22	20	19	17	16	15	14	13	12	11
	46	39	33	29	26	23	21	19	17	16	15	14	13	12	11	10
	43	36	31	27	24	22	20	18	17	16	15	14	13	12	11	10
	41	34	29	25	23	21	19	17	16	15	14	13	12	11	10	9
	39	33	28	24	22	20	18	16	15	14	13	12	11	10	9	8
	36	30	26	23	20	18	17	16	15	14	13	12	11	10	9	8

\*If soft coal is to be used, see note, page 231.

## No. 1-D Ideal Laundry Water Heater

Heater's total potential energy, 168,000 British thermal units

1—Hours .....	5	6	7	8	9	10	11	12
2—Hard coal* per hr., lbs...	4.2	3.5	3.0	2.6	2.3	2.1	1.9	1.7
3—Power per hr., B. t. u....	33600	28000	24000	21000	18666	16800	15272	14000
4—Radiation sq. ft.....	189	159	135	119	104	94	86	79

### Capacity in U. S. gallons per hour

Temperature rise Fahrenheit degrees per hour	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
25.....	161	134	115	100	89	81	73	67	62	57	52	48	44	41	38	35
30.....	134	112	96	84	74	67	61	56	52	48	44	41	38	35	32	29
35.....	115	96	82	72	64	58	52	48	44	41	37	33	30	28	25	22
40.....	100	83	71	63	56	50	45	40	37	34	30	28	25	22	20	18
45.....	89	74	64	56	49	45	40	37	34	31	28	25	23	21	19	17
50.....	81	68	58	51	45	41	37	34	30	28	25	23	21	19	17	16
55.....	73	61	52	46	41	37	33	30	28	25	23	21	19	17	16	15
60.....	67	56	46	42	37	34	30	28	25	23	21	19	17	16	15	14
65.....	62	52	44	39	34	31	28	27	24	22	20	18	17	16	15	14
70.....	57	48	41	36	32	29	26	24	22	20	18	17	16	15	14	13
75.....	52	43	37	33	29	26	24	22	20	18	17	16	15	14	13	12
80.....	50	41	35	31	28	25	23	21	19	18	17	16	15	14	13	12
85.....	47	38	33	29	26	24	21	19	18	17	16	15	14	13	12	11
90.....	45	37	32	28	24	22	20	18	17	16	15	14	13	12	11	10
95.....	43	36	31	27	23	21	19	17	16	15	14	13	12	11	10	9
100.....	41	34	29	25	22	20	18	16	15	14	13	12	11	10	9	8

## No. 101 Ideal Premier Junior Water Heater

Heater's total potential energy, 240,000 British thermal units

1—Hours .....	5	6	7	8	9	10	11	12
2—Hard coal *per hr., lbs...	6.40	5.33	4.57	4.00	3.55	3.20	2.91	2.67
3—Power per hr., B. t. u....	48000	40000	34285	30000	26666	24000	21818	20000
4—Radiation, sq. ft.....	271	226	192	170	147	135	124	113

### Capacity in U. S. gallons per hour

Temperature rise Fahrenheit degrees per hour	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
25.....	231	192	165	144	128	116	105	96	87	80	75	69	65	60	56	53
30.....	193	160	137	120	107	96	87	80	75	69	65	60	56	53	50	47
35.....	165	137	117	103	91	82	75	69	65	60	56	53	50	47	44	41
40.....	144	120	103	90	80	72	65	60	56	53	50	47	44	41	38	35
45.....	128	106	91	80	70	64	58	52	48	44	41	37	34	31	28	25
50.....	116	96	82	72	64	58	52	47	44	40	37	34	31	28	25	22
55.....	105	87	75	65	58	52	47	44	40	37	34	31	28	25	22	20
60.....	96	80	68	60	53	48	44	40	37	34	31	28	25	22	20	18
65.....	89	74	63	56	49	44	40	37	34	31	28	25	22	20	18	16
70.....	83	68	58	51	45	41	37	34	31	28	25	22	20	18	16	15
75.....	77	64	55	48	42	38	35	32	29	27	25	22	20	18	16	15
80.....	72	60	51	45	40	36	33	30	27	25	22	20	18	16	15	14
85.....	67	56	48	42	37	34	31	28	25	22	20	18	16	15	14	13
90.....	65	53	45	40	35	32	29	27	25	22	20	18	16	15	14	13
95.....	61	50	43	38	33	30	27	25	22	20	18	16	15	14	13	12
100.....	58	48	41	36	32	29	26	24	22	20	18	16	15	14	13	12

\*If soft coal is to be used see note; page 231.



## No. 10 Ideal Junior Water Heater

Heater's total potential energy, 320,000 British thermal units

1—Hours .....	5	6	7	8	9	10	11	12
2—Hard coal* per hr., lbs..	8.00	6.66	5.72	5.00	4.44	4.00	3.63	3.33
3—Power per hr., B. t. u...	<b>64000</b>	<b>53333</b>	<b>45714</b>	<b>40000</b>	<b>35555</b>	<b>32000</b>	<b>29090</b>	<b>26666</b>
4—Radiation, sq. ft.....	362	302	258	226	200	181	164	150

### Capacity in U. S. gallons per hour

Temperature rise Fahrenheit degrees per hour	25.....	307	257	219	<b>192</b>	171	154	139	128
	30.....	256	213	183	<b>160</b>	142	128	116	106
	35.....	219	182	156	137	121	109	100	91
	40.....	192	160	137	<b>120</b>	107	96	87	80
	45.....	170	142	121	<b>106</b>	94	85	77	70
	50.....	154	128	110	96	85	77	70	64
	55.....	139	116	100	87	77	70	63	58
	60.....	128	107	91	80	71	64	58	53
	65.....	118	99	84	74	65	59	53	49
	70.....	109	91	78	68	61	55	50	45
	75.....	102	85	73	64	57	51	46	43
	80.....	96	80	69	60	53	48	44	40
	85.....	90	75	64	56	50	45	40	37
	90.....	85	71	61	53	47	43	39	35
	95.....	80	67	57	50	44	41	36	33
	100.....	77	64	55	48	43	39	35	32

## No. 12 Ideal Arco Water Heater

Heater's total potential energy, 246,400 British thermal units

1—Hours .....	5	6	7	8	9	10	11	12
2—Hard coal* per hr., lbs..	6.40	5.33	4.57	4.00	3.55	3.20	2.91	2.67
3—Power per hr., B. t. u...	<b>49280</b>	<b>41066</b>	<b>35200</b>	<b>30800</b>	<b>27377</b>	<b>24640</b>	<b>22400</b>	<b>20533</b>
4—Radiation, sq. ft.....	275	230	197	173	155	138	125	115

### Capacity in U. S. gallons per hour

Temperature rise Fahrenheit degrees per hour	25.....	236	197	169	<b>148</b>	131	118	107	99
	30.....	196	163	140	<b>123</b>	109	98	89	82
	35.....	169	140	120	105	93	84	76	70
	40.....	148	123	106	<b>93</b>	82	74	67	62
	45.....	132	110	94	<b>83</b>	73	66	60	55
	50.....	118	97	84	74	66	59	54	49
	55.....	108	90	77	68	60	54	49	45
	60.....	98	82	70	61	56	49	45	41
	65.....	90	75	64	56	50	45	41	38
	70.....	84	70	60	53	47	42	38	35
	75.....	78	65	56	49	43	39	35	33
	80.....	74	62	53	46	41	37	33	31
	85.....	68	57	48	43	38	34	31	28
	90.....	64	53	46	40	36	32	29	27
	95.....	62	52	44	39	34	31	28	26
	100.....	60	50	43	38	33	30	27	25

\* If soft coal is to be used, see note, page 231.

## No. 121 Ideal Premier Junior Water Heater

Heater's total potential energy, 350,000 British thermal units

1—Hours.....	5	6	7	8	9	10	11	12
2—Hard coal*per hr., lbs..	8.6	7.16	6.14	5.38	4.78	4.3	3.91	3.58
3—Power per hr., B. t. u...	70000	58333	50000	43750	38888	35000	31818	29166
4—Radiation, sq. ft.	395	328	282	249	220	198	181	164

### Capacity in U. S. gallons per hour

Temperature rise Fahrenheit degrees per hour	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
	336	280	240	210	187	168	154	140	128	117	109	100	96	88	81	75
	280	233	200	175	155	140	128	117	105	96	88	81	75	69	64	60
	239	200	171	150	133	120	109	100	91	83	76	70	64	59	54	50
	210	175	150	132	117	105	96	88	81	75	69	64	59	54	50	47
	186	155	133	117	103	93	85	78	71	65	59	54	49	45	41	38
	168	140	120	105	93	84	77	70	64	58	53	48	44	40	37	34
	153	127	109	96	85	76	70	64	58	53	48	44	40	37	34	31
	140	117	100	88	78	70	64	58	53	48	44	40	37	34	31	28
	129	107	92	81	71	65	59	54	49	45	41	38	35	32	29	26
	120	100	86	75	67	60	55	50	45	41	38	35	32	29	26	23
	112	93	80	70	62	56	51	47	43	39	36	33	30	27	24	21
	105	87	75	66	58	52	48	44	40	37	34	31	28	25	22	19
	98	82	70	61	55	49	45	41	38	35	32	29	26	23	20	17
	93	77	67	58	51	47	43	39	36	33	30	27	24	21	18	15
	88	73	63	55	49	44	41	37	34	31	28	25	22	19	16	13
	84	70	60	53	47	42	39	35	32	29	26	23	20	17	14	11

## No. 12 Ideal Junior Water Heater

Heater's total potential energy, 352,000 British thermal units

1—Hours.....	5	6	7	8	9	10	11	12
2—Hard Coal per hr., lbs..	8.00	6.66	5.72	5.00	4.44	4.00	3.63	3.33
3—Power per hr., B. t. u...	70400	58666	50285	44000	39111	35200	32000	29333
4—Radiation, sq. ft.	398	332	284	249	220	199	180	165

### Capacity in U. S. gallons per hour

Temperature rise Fahrenheit degrees per hour	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
	336	280	240	210	187	168	154	140	128	117	109	100	96	88	81	75
	280	233	200	175	155	140	128	117	105	96	88	81	75	69	64	60
	239	200	171	150	133	120	109	100	91	83	76	70	64	59	54	50
	210	175	150	132	117	105	96	88	81	75	69	64	59	54	50	47
	186	155	133	117	103	93	85	78	71	65	59	54	49	45	41	38
	168	140	120	105	93	84	77	70	64	58	53	48	44	40	37	34
	153	127	109	96	85	76	70	64	58	53	48	44	40	37	34	31
	140	117	100	88	78	70	64	58	53	48	44	40	37	34	31	28
	129	108	93	81	71	65	59	54	49	45	41	38	35	32	29	26
	120	100	86	75	67	60	55	50	45	41	38	35	32	29	26	23
	112	93	80	70	62	56	51	47	43	39	36	33	30	27	24	21
	105	87	74	66	58	52	48	44	40	37	34	31	28	25	22	19
	98	82	70	61	54	49	45	41	38	35	32	29	26	23	20	17
	93	78	67	58	51	47	43	39	36	33	30	27	24	21	18	15
	88	73	63	55	49	44	41	37	34	31	28	25	22	19	16	13
	84	70	60	53	47	42	39	35	32	29	26	23	20	17	14	11

\*If soft coal is to be used, see note, page 231

## No. 122 Ideal Premier Junior Water Heater

Heater's total potential energy, 385,000 British thermal units

1—Hours .....	5	6	7	8	9	10	11	12
2—Hard coal per hr., lbs..	8.6	7.16	6.14	5.38	4.78	4.3	3.91	3.58
3—Power per hr., B. t. u.	77000	64166	55000	48125	42777	38500	35000	32000
4—Radiation, sq. ft.	435	361	310	274	242	218	199	180

### Capacity in U. S. gallons per hour

Temperature rise Fahrenheit degrees per hour	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
	370	308	264	231	205	185	168	154	140	128	110	96	85	77	70	64
	308	257	220	193	165	144	128	116	105	96	87	79	72	65	60	55
	264	220	189	165	147	132	120	110	101	93	85	77	70	64	59	54
	231	193	165	144	128	116	105	96	87	79	72	65	60	55	51	47
	205	171	146	128	114	102	93	85	77	70	64	59	54	50	46	43
	185	154	132	116	103	92	84	76	70	64	59	54	50	46	43	40
	168	139	119	105	93	84	76	70	64	59	54	50	46	43	40	38
	154	128	110	96	86	77	70	64	59	54	50	46	43	40	38	36
	140	119	102	89	79	72	65	60	55	51	47	43	40	38	36	34
	128	110	94	83	73	66	60	55	51	47	43	40	38	36	34	32
	110	103	88	77	68	62	56	51	47	43	40	38	36	34	32	30
	96	95	82	72	64	57	52	48	45	42	39	36	34	32	30	28
	85	90	77	67	60	54	49	45	42	39	36	34	32	30	28	26
	77	86	74	65	57	52	47	43	40	38	36	34	32	30	28	26
	70	81	69	61	54	48	44	40	38	36	34	32	30	28	26	24
	64	77	66	58	51	46	42	38	36	34	32	30	28	26	24	22

## No. 15 Ideal Arco Water Heater

Heater's total potential energy, 403,200 British thermal units

1—Hours .....	5	6	7	8	9	10	11	12
2—Hard coal* per hr. lbs..	11.2	9.33	8.00	7.00	6.22	5.60	5.09	4.66
3—Power per hr., B. t. u.	80640	67200	57600	50400	44800	40320	36654	33600
4—Radiation, sq. ft.	456	380	326	285	254	228	207	190

### Capacity in U. S. Gallons per hour

Temperature rise Fahrenheit degrees per hour	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
	388	323	277	242	216	194	176	162	146	134	121	110	101	93	85	79
	323	268	230	201	179	161	146	134	121	110	101	93	85	79	74	68
	277	230	197	173	153	138	125	115	106	98	90	81	74	68	63	58
	242	201	173	151	134	121	110	101	93	85	79	74	68	63	59	54
	216	180	154	135	120	108	98	90	81	74	68	63	59	54	50	46
	194	162	139	121	108	97	88	81	74	68	63	59	54	50	46	43
	176	147	126	110	99	88	80	73	68	63	59	54	50	46	43	40
	162	135	116	101	90	81	74	68	63	59	54	50	46	43	40	38
	146	125	107	94	83	75	68	63	59	54	50	46	43	40	38	36
	134	115	99	86	77	69	63	58	54	50	46	43	40	38	36	34
	121	108	93	81	72	65	59	54	50	46	43	40	38	36	34	32
	110	103	88	77	68	62	56	51	47	43	40	38	36	34	32	30
	101	95	82	72	64	57	52	48	45	42	39	36	34	32	30	28
	93	90	77	67	60	54	49	45	42	39	36	34	32	30	28	26
	85	86	74	65	57	52	48	45	42	39	36	34	32	30	28	26
	79	81	69	61	54	48	44	40	38	36	34	32	30	28	26	24
	74	77	66	58	51	46	42	38	36	34	32	30	28	26	24	22
	68	70	60	52	46	41	37	33	30	28	26	24	22	20	18	16

\*If soft coal is to be used, see note page 231.



## No. 151 Ideal Premier Junior Water Heater

Heater's total potential energy, 560,000 British thermal units

1—Hours .....	5	6	7	8	9	10	11	12
2—Hard coal* per hr., lbs...	14.4	12.0	10.3	9.0	8.0	7.2	6.54	6.0
3—Power per hr., B. t. u. ...	112000	93333	80000	70000	62222	56000	50909	46666
4—Radiation, sq. ft. ....	632	525	452	395	350	316	288	265

### Capacity in U. S. gallons per hour

Temperature rise Fahrenheit degrees per hour	25.....	538	448	384	336	298	269	244	224
	30.....	448	373	320	280	249	224	204	187
	35.....	384	319	274	239	213	192	174	160
	40.....	336	280	240	210	187	168	153	140
	45.....	297	247	212	186	165	148	135	124
	50.....	269	224	192	168	149	134	122	112
	55.....	244	203	174	153	135	122	111	102
	60.....	224	186	160	140	124	112	102	93
	65.....	207	172	148	129	115	104	94	86
	70.....	192	159	136	120	106	96	87	80
	75.....	179	149	128	112	99	90	81	75
	80.....	168	140	120	105	93	84	76	70
	85.....	157	131	112	98	87	78	71	65
	90.....	148	124	106	93	83	74	68	62
	95.....	140	117	100	88	78	70	64	58
	100.....	135	112	96	84	74	67	61	56

## No. 152 Ideal Premier Junior Water Heater

Heater's total potential energy, 616,000 British thermal units

1—Hours.....	5	6	7	8	9	10	11	12
2—Hard coal* per hr; lbs...	14.4	12.0	10.3	9.0	8.0	7.2	6.54	6.00
3—Power per hr., B. t. u. ...	123200	102666	88000	77000	68444	61600	56000	51333
4—Radiation, sq. ft. ....	695	578	497	435	385	348	317	292

### Capacity in U. S. gallons per hour

Temperature rise Fahrenheit degrees per hour	25.....	596	497	426	373	331	298	269	244
	30.....	498	415	356	311	277	249	224	204
	35.....	426	355	304	266	237	213	192	174
	40.....	374	312	267	234	208	187	168	153
	45.....	330	275	236	206	183	165	148	135
	50.....	298	249	213	187	166	149	134	122
	55.....	270	225	193	169	150	135	122	111
	60.....	249	208	178	156	139	124	112	102
	65.....	230	192	164	144	128	115	104	94
	70.....	213	178	152	133	118	106	96	87
	75.....	198	165	141	124	110	99	90	81
	80.....	186	155	133	116	103	93	84	76
	85.....	174	145	124	109	97	87	78	71
	90.....	166	138	119	104	92	83	74	68
	95.....	156	130	111	98	87	78	70	64
	100.....	148	123	106	93	82	74	67	61

\* If soft coal is to be used, see note, page 231.

## No. 20 Ideal Junior Water Heater

**Heater's total potential energy, 640,000 British thermal units**

	5	6	7	8	9	10	11	12
1—Hours.....	5	6	7	8	9	10	11	12
2—Hard coal* per hr., lbs..	16.00	13.33	11.43	10.00	8.89	8.00	7.27	6.66
3—Power per hr., B. t. u..	<b>120000</b>	<b>106666</b>	<b>91428</b>	<b>80000</b>	<b>71111</b>	<b>64000</b>	<b>58181</b>	<b>53333</b>
4—Radiation, sq. ft.....	720	600	515	450	400	360	327	300

### Capacity in U. S. gallons per hour

Temperature rise Fahrenheit degrees per hour	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
25.....	614	512	439	<b>384</b>	341	307	280									
30.....	512	426	365	<b>320</b>	284	256	233	213								
35.....	438	365	313	<b>274</b>	243	219	199	183								
40.....	384	320	274	<b>240</b>	213	192	175	160								
45.....	339	283	242	<b>212</b>	188	170	154	141								
50.....	307	256	220	192	170	154	140	128								
55.....	278	232	194	174	154	139	126	116								
60.....	256	213	183	160	142	128	116	107								
65.....	237	197	169	148	131	118	108	99								
70.....	219	183	156	136	122	110	100	92								
75.....	205	170	146	128	114	102	93	85								
80.....	192	160	137	120	107	96	88	80								
85.....	179	149	128	112	99	90	81	75								
90.....	169	142	121	106	94	85	77	71								
95.....	160	133	114	100	90	80	73	67								
100.....	153	128	110	96	85	77	70	64								

## No. 22 Ideal Junior Water Heater

**Heater's total potential energy, 704,000 British thermal units**

	5	6	7	8	9	10	11	12
1—Hours.....	5	6	7	8	9	10	11	12
2—Hard coal* per hr., lbs..	16.00	13.33	11.44	10.00	8.90	8.00	7.26	6.66
3—Power per hr., B. t. u..	<b>140800</b>	<b>117000</b>	<b>100571</b>	<b>88000</b>	<b>78222</b>	<b>70400</b>	<b>64000</b>	<b>58666</b>
4—Radiation, sq. ft.....	792	660	567	495	440	396	360	330

### Capacity in U. S. gallons per hour

Temperature rise Fahrenheit degrees per hour	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
25.....	672	560	480	<b>426</b>	373	336	305	280								
30.....	560	467	400	<b>356</b>	311	280	256	233								
35.....	478	397	341	304	266	239	217	199								
40.....	420	350	300	<b>267</b>	233	210	191	175								
45.....	372	310	266	<b>236</b>	207	186	169	155								
50.....	336	280	240	213	187	168	153	140								
55.....	306	255	219	193	170	153	139	128								
60.....	280	233	200	178	156	140	127	117								
65.....	258	215	184	164	143	129	117	108								
70.....	240	200	171	152	133	120	109	100								
75.....	224	187	160	141	124	112	102	93								
80.....	210	175	150	133	117	105	95	88								
85.....	196	163	140	124	109	98	89	82								
90.....	186	155	133	119	103	93	85	78								
95.....	176	147	126	111	98	88	80	73								
100.....	168	140	120	106	93	84	76	70								

\*If soft coal is to be used, see note, page 231.



## No. 181 Ideal Premier Junior Water Heater

Heater's total potential energy, 1,000,000 British thermal units

1—Hours .....	5	6	7	8	9	10	11	12
2—Hard coal* per hr., lbs..	24.8	20.7	17.7	15.5	13.8	12.4	11.2	10.3
3—Power per hr., B. t. u. ...	200000	166666	142857	125000	111111	100000	90909	83333
4—Radiation, sq. ft. ....	1130	944	810	707	627	565	515	470

### Capacity in U. S. Gallons per hour

Temperature rise Fahrenheit, degrees per hour	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
	960	800	685	600	533	480	440	400	367	333	300	275	250	222	200	181
	800	668	571	500	445	400	367	333	300	275	250	222	200	181	166	154
	685	571	490	428	380	342	314	285	250	222	200	181	166	154	142	133
	600	500	428	375	333	300	275	250	222	200	181	166	154	142	131	125
	533	444	381	333	296	267	245	222	200	181	166	154	142	131	120	117
	480	400	342	300	267	240	220	200	184	166	154	142	131	120	109	100
	436	363	312	272	242	218	200	184	166	154	142	131	120	109	100	90
	400	333	285	250	222	200	184	166	154	142	131	120	109	100	90	81
	369	308	264	231	205	184	169	154	142	131	120	109	100	90	81	73
	342	285	245	213	190	171	157	142	131	120	109	100	90	81	73	66
	320	267	229	200	178	160	147	133	123	111	100	90	81	73	66	60
	300	250	215	188	167	150	138	125	117	107	97	88	80	72	65	59
	282	235	202	177	157	141	129	117	107	97	88	80	72	65	59	54
	267	223	190	167	148	133	123	111	100	90	81	73	66	60	54	49
	252	210	180	158	140	126	116	105	95	86	77	69	62	56	50	45
	240	200	171	150	133	120	110	100	90	81	73	66	60	54	49	44

## No. 30 Ideal Junior Water Heater

Heater's potential energy, 1,000,000 British thermal units

1—Hours .....	5	6	7	8	9	10	11	12
2—Hard coal* per. hr., lbs..	25.0	20.8	17.8	15.6	13.9	12.5	11.4	10.4
3—Power per hr., B. t. u. ...	200000	166666	142857	125000	111000	100000	90909	83333
4—Radiation, sq. ft. ....	1130	944	810	707	627	565	515	470

### Capacity in U. S. Gallons per hour

Temperature rise Fahrenheit, degrees per hour	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
	960	800	685	600	533	480	440	400	367	333	300	275	250	222	200	181
	800	668	571	500	445	400	367	333	300	275	250	222	200	181	166	154
	685	571	490	428	380	342	314	285	250	222	200	181	166	154	142	133
	600	500	428	375	333	300	275	250	222	200	181	166	154	142	131	125
	533	444	381	333	296	267	245	222	200	181	166	154	142	131	120	117
	480	400	342	300	267	240	220	200	184	166	154	142	131	120	109	100
	436	363	312	272	242	218	200	184	166	154	142	131	120	109	100	90
	400	333	285	250	222	200	184	166	154	142	131	120	109	100	90	81
	369	308	264	231	205	184	169	154	142	131	120	109	100	90	81	73
	342	285	245	213	190	171	157	142	131	120	109	100	90	81	73	66
	320	267	229	200	178	160	147	133	123	111	100	90	81	73	66	60
	300	250	215	188	167	150	138	125	117	107	97	88	80	72	65	59
	282	235	202	177	157	141	129	117	107	97	88	80	72	65	59	54
	267	223	190	167	148	133	123	111	100	90	81	73	66	60	54	49
	252	210	180	158	140	126	116	105	95	86	77	69	62	56	50	45
	240	200	171	150	133	120	110	100	90	81	73	66	60	54	49	44

\* If soft coal is to be used, see note, page 231.

# 191 No. 182 Ideal Premier Junior Water Heater

Heater's total potential energy, 1,100,000 British thermal units

	5	6	7	8	9	10	11	12
1—Hours .....	5	6	7	8	9	10	11	12
2—Hard coal* per hr., lbs.	24.8	20.7	17.7	15.5	13.8	12.4	11.2	10.3
3—Power per hr., B. t. u.	220000	183333	157142	137500	122222	110000	100000	91666
4—Radiation, sq. ft. ....	1243	1038	891	778	690	622	567	517

## Capacity in U. S. Gallons per hour

Temperature rise Fahrenheit degrees per hour	5	6	7	8	9	10	11	12
25.....	1056	880	754	660	587	528	480	440
30.....	880	733	628	550	489	440	400	367
35.....	752	627	537	470	418	376	342	314
40.....	660	550	471	412	367	330	300	275
45.....	587	490	419	367	326	294	267	245
50.....	528	440	377	330	294	264	240	220
55.....	479	400	343	300	266	240	218	200
60.....	440	367	314	275	245	220	200	184
65.....	405	337	289	253	225	202	184	169
70.....	376	314	269	235	209	188	171	157
75.....	352	293	251	220	196	176	160	147
80.....	330	275	236	206	184	165	150	138
85.....	310	259	222	194	172	155	141	129
90.....	294	245	209	183	163	147	133	123
95.....	277	231	198	173	154	139	126	116
100.....	264	220	189	165	147	132	120	110

# No. 32 Ideal Junior Water Heater

Heater's total potential energy, 1,100,000 British thermal units

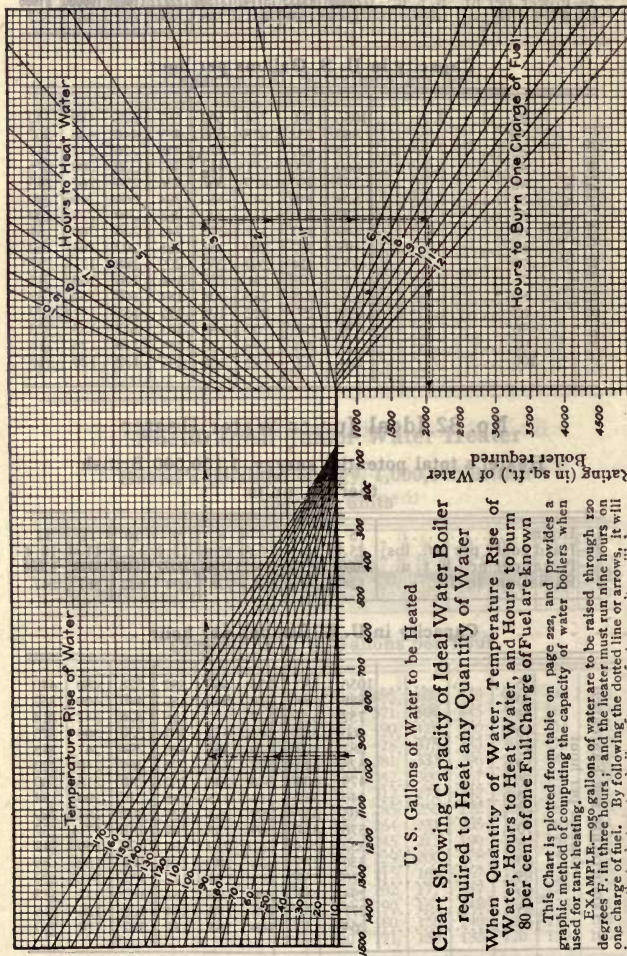
	5	6	7	8	9	10	11	12
1—Hours .....	5	6	7	8	9	10	11	12
2—Hard coal* per hr., lbs.	25.0	20.8	17.8	15.6	13.9	12.5	11.4	10.4
3—Power per hr., B. t. u.	220000	183333	157142	137500	122222	110000	100000	91666
4—Radiation, sq. ft. ....	1243	1038	891	778	690	622	567	517

## Capacity in U. S. Gallons per hour

Temperature rise Fahrenheit degrees per hour	5	6	7	8	9	10	11	12
25.....	1056	880	754	660	587	528	480	440
30.....	880	733	628	550	489	440	400	367
35.....	752	627	537	470	418	376	342	314
40.....	660	550	471	412	367	330	300	275
45.....	587	490	419	367	326	294	267	245
50.....	528	440	377	330	294	264	240	220
55.....	479	400	343	300	266	240	218	200
60.....	440	367	314	275	245	220	200	184
65.....	405	337	289	253	225	202	184	169
70.....	376	314	269	235	209	188	171	157
75.....	352	293	251	220	196	176	160	147
80.....	330	275	236	206	184	165	150	138
85.....	310	259	222	194	172	155	141	129
90.....	294	245	209	183	163	147	133	123
95.....	277	231	198	173	154	139	126	116
100.....	264	220	189	165	147	132	120	110

\*If soft coal is to be used, see note, page 231.

# Chart Showing Capacity of Ideal Water Boiler required to Heat any Quantity of Water



U. S. Gallons of Water to be Heated

**Chart Showing Capacity of Ideal Water Boiler  
required to Heat any Quantity of Water**

**When Quantity of Water, Temperature Rise of  
Water, Hours to Heat Water, and Hours to burn  
80 per cent of one Full Charge of Fuel are known**

This Chart is plotted from table on page 222, and provides a graphic method of computing the capacity of water boilers when used for tank heating.

EXAMPLE.—950 gallons of water are to be raised through 120 degrees F. in three hours; and the heater must run nine hours on one charge of fuel. By following the dotted line or arrows, it will



# Chart to Find Boiler Power Required to Heat Swimming-Pools

(Copyright, 1905, by American Radiator Company)

In heating large bodies of water large Boilers are employed, and when anthracite coal is burned in IDEAL Boilers there will be available, from each pound of coal burned, an average of 8,333 British thermal units, or 8.6 pounds water will be evaporated, and on this basis the chart on page 230 is plotted. The basis for finding the size IDEAL Boiler required for a given quantity of work is the consumption of 8 pounds of hard coal per square foot of grate per hour. That IDEAL Boilers will do this work is well proven by actual demonstration, in exhaustive laboratory tests and in regular installations.

The horizontal lines on chart, page 230, represent water in U. S. gallons, which may be increased by any suitable multiplier, providing the coal and steam required are increased in like proportion.

The figures at the bottom of vertical lines show the coal required, each line representing 10 pounds, and those at the top, the steam generated by the combustion of the quantity of coal on the same vertical line—each line representing 86 pounds of steam. The diagonal lines represent the rise, or increase, in temperature of the water per hour in Fahrenheit degrees.

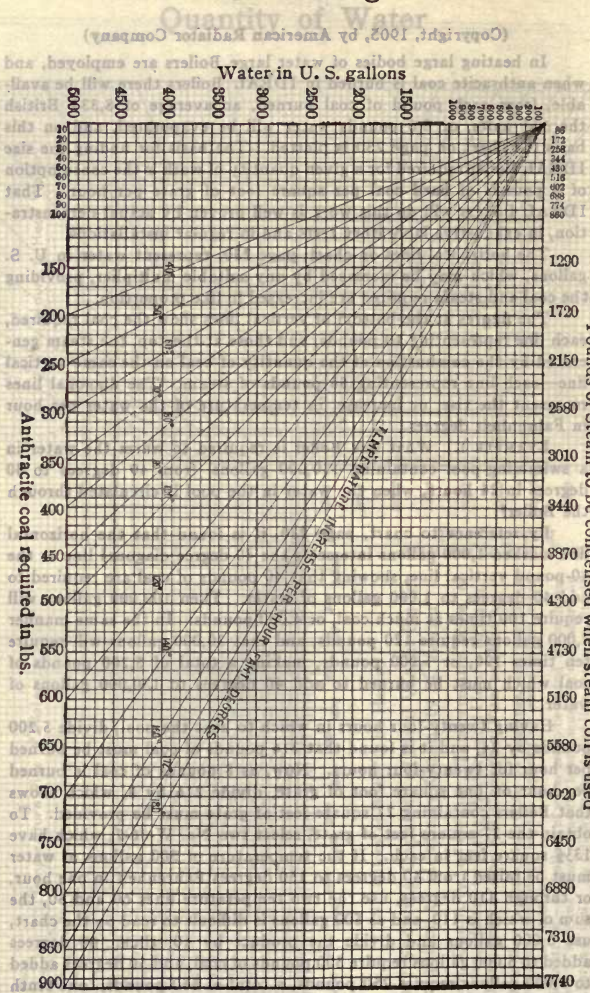
**EXAMPLE 1.** What size Boiler is required to warm the water in a swimming-pool containing 130,000 gallons, from 40 degrees to 80 degrees in 24 hours, when the water in the pool is circulated through the Boiler?

By reference to chart, page 230, it is found that the horizontal line marked 1,000 gallons intersects the 40-degree diagonal line at the 40-pound vertical line, showing that 40 pounds of coal are required to add 40 degrees to 1,000 gallons of water. Then 100,000 gallons will require 100 times as much coal, or 4,000 pounds. In the same manner 3,000 gallons require 120 pounds, and that 30,000 gallons will require ten times 120, or 1,200 pounds, making a total of 5,200 pounds of coal which must be burned to add 40 degrees to 130,000 gallons of water.

Having twenty-four hours in which to heat the pool, divide 5,200 pounds by 24, and it is found that 216 pounds of coal must be burned per hour for twenty-four hours. Now, as 8 pounds of coal is burned per hour on one square foot of grate, divide 216 by 8, which shows that Boilers containing 27 square feet of grate must be provided. To obtain the 27 square feet of grate, select two No. W-36-7, which have  $13\frac{1}{2}$  square feet in each. If the temperature of 500 gallons of water must be raised from 40 degrees to 150 degrees Fahrenheit in one hour, or through 110 degrees, use the two temperature lines 60 and 50, the sum of which is 110, and as 500 gallons is difficult to read on the chart, use 5,000 gallons and divide the product by 10, thus: 60 degrees added to 5,000 gallons require 300 pounds of coal, and 50 degrees added to 5,000 gallons require 250 pounds, a total of 550 pounds; one-tenth of which is 55 pounds, requiring a Boiler with a grate area of 7 square feet.

(Continued Page 231)

# Chart to Find Boiler Power Required to Heat Swimming-Pools





# Chart to Find Boiler Power Required to Heat Swimming-Pools—Continued

## Heating Pools by Steam Coils

**EXAMPLE 2.** If the same pool under like conditions is to be heated by steam through pipe coils and the temperature of the steam is 220 degrees, the mean temperature of the water is 40 plus 80 divided by 2 equals 60 degrees and 220 minus 60 equals 160 degrees temperature difference between steam and water.

Turn to chart, page 233, which shows that with this temperature difference 1 square foot of iron pipe will condense 36 pounds of steam per hour, and as 216 pounds of coal must be burned per hour, find by interpolation in chart, page 230, that 216 pounds of coal will evaporate 1,857 pounds steam, which divided by 36 will give in round figures 52 square feet, the amount of condensing pipe required. The grate surface of Boilers will be the same as in Example 1.

Fifty-two square feet is equal to 120 lineal feet of 1¼-inch pipe, 104 feet 1½-inch, or 83 feet of 2-inch. If but twelve hours can be allowed to do the work, double the hourly consumption of coal and steam and furnish Boilers of double the capacity required for twenty-four hours' time.

For the twelve-hour period there will be just double the quantity of steam to condense per hour, requiring 104 square feet of condensing coil.

There is, however, another factor which must not be overlooked. In large bodies of water warmed in the manner just described, there will be a zone, of which the condensing pipe is the center, where the mean temperature of the water will be much higher than figured in the foregoing, unless artificial means are employed to agitate the water and keep it all at an even temperature. It will, therefore, be good practice to add at least 50 per cent to the condensing coil when used in large bodies of still water.

## Hard Coal versus Soft Coal

**NOTE.**—All computations in these charts are made on the basis of anthracite coal, for the reason that the available heating power of anthracite coal is practically constant. The semi-bituminous coals and all good caking soft coals yield just about the same quantities of available heating power as does the best anthracite coal, but the available heating power derived from the free burning soft coal (i. e. coal that does not fuse and mat together under heat), is about 40 per cent less than for caking coals.

When caking coals are burned, they fuse at comparatively low temperatures, forming a crust over the top of the fire which prevents the immediate escape of the volatile gases that comprise from 40 to 50 per cent of the fuel's heating power. These gases are then driven to the side of the fire-pot where they unite with the rising oxygen and, igniting at that point, are converted into valuable heating power.

When free burning coals are used, they disintegrate at comparatively low temperatures and the hydro-carbon gases escape without coming in contact with the necessary oxygen for ignition.

# Relative Efficiency of Iron, Brass, and Copper Pipe when used in Storage Tanks

The chart (page 233) is plotted from a large number of tests made with copper, brass, black and galvanized iron pipe placed *vertically* in a tank of water.

About 80 per cent of the power developed is shown on the chart, leaving 20 per cent as a margin of safety.

When pipe-coils are used in the fire-pot of Boilers or hot-air furnaces for heating water or radiation, there is practically no difference in the transmitting power of iron, brass, or copper. For domestic water supply an independent Water Heater should be provided, and connected to an independent chimney flue. If a coil is used an abnormal fire is often maintained for a minor service and fuel is wasted. An independent Water Heater is also desirable, as it can be used in summer, when the heating apparatus is out of use. We strongly recommend in house-heating Boilers for Steam and Water that the use of pipe-coils should be discouraged.

The following example shows how to use the chart (page 233):—

*Example.*—It is required to condense 500 pounds of steam per hour in a pipe-coil immersed in the water of a storage tank.

Temperature of steam in pipe.....	220 degrees
Initial temperature of water.....	40 degrees
Terminal temperature of water.....	160 degrees
Mean temperature of water.....	100 degrees
Temperature difference steam and water..	120 degrees

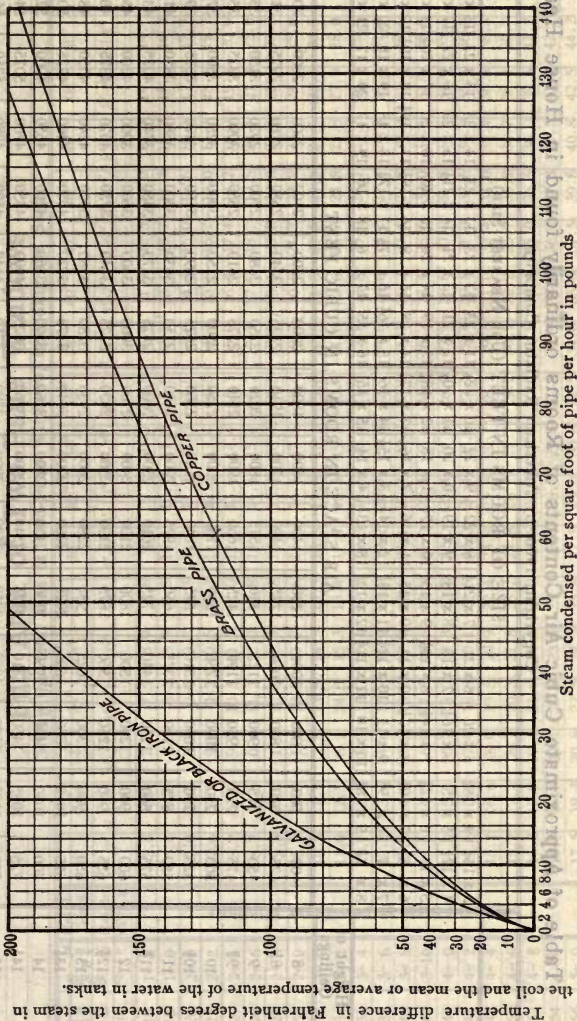
The curved line for galvanized or black pipe on chart (page 233) crosses the horizontal line of 120 degrees temperature difference at the vertical line representing 24 pounds, which means that one square foot of black or galvanized pipe will condense 24 pounds of steam when the temperature difference is 120 degrees.

The brass-pipe curve shows 51 pounds, and the copper-pipe curve 59 pounds.

The quantity of pipe required in square feet is determined by dividing the 500 pounds of steam which must be condensed per hour by the quantity of steam one square foot of pipe will condense. Thus:—

Iron pipe.....	$\frac{500}{24} = 20.8$ square feet required
Brass pipe.....	$\frac{500}{51} = 9.8$ square feet required
Copper pipe.....	$\frac{500}{59} = 8.5$ square feet required

# Chart to Determine the Square Feet of Heating Pipe for Storage Tanks





# Table of Approximate Cubic Air Contents of Rooms ordinarily found in House Heating

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## SIZE OF ROOMS IN FEET (USE NEAREST SIZE)

3 x 16½	4 x 18½	5 x 20	6 x 21	7 x 21½	8 x 22	9 x 22	10 x 22½	11 x 23	12 x 23	13 x 23	14 x 23	15 x 23	16 x 23½	17 x 23½
4 x 12½	5 x 15	6 x 16½	7 x 18	8 x 18½	9 x 19½	10 x 20	11 x 20½	12 x 21	13 x 21	14 x 21½	15 x 22	16 x 22	17 x 22	18 x 22½
5 x 10	6 x 12½	7 x 14½	8 x 15½	9 x 16½	10 x 17½	11 x 18	12 x 18½	13 x 19	14 x 20	15 x 20	16 x 20	17 x 20½	18 x 21½	19 x 21½
6 x 8½	7 x 10½	8 x 12½	9 x 14	10 x 15	11 x 16	12 x 16½	13 x 17½	14 x 18	15 x 18	16 x 18½	17 x 19½	18 x 19½	19 x 20	20 x 20
7 x 7	8 x 9½	9 x 11	10 x 12½	11 x 13½	12 x 14½	13 x 15½	14 x 16	15 x 16½	16 x 17½	17 x 17½	18 x 18	19 x 18	20 x 19	21 x 19
8 x 6½	9 x 8½	10 x 10	11 x 11½	12 x 12½	13 x 13½	14 x 14½	15 x 15	16 x 15	17 x 16	18 x 16	19 x 17	20 x 17	21 x 18	22 x 18

## AIR SPACE IN ROOMS IN CUBIC FEET

8	400	600	800	1000	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3200
8½	425	640	850	1060	1275	1490	1700	1910	2125	2340	2550	2760	2975	3190	3400
9	450	675	900	1125	1350	1575	1800	2020	2250	2480	2700	2920	3150	3370	3600
9½	475	715	950	1190	1425	1660	1900	2140	2375	2610	2850	3090	3325	3560	3800
10	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750	4000
10½	525	790	1050	1310	1575	1840	2100	2360	2625	2890	3150	3420	3675	3940	4200
11	550	825	1100	1375	1650	1925	2200	2480	2750	3030	3300	3580	3850	4130	4400
11½	575	860	1150	1440	1725	2010	2300	2600	2875	3170	3450	3740	4025	4310	4600
12	600	900	1200	1500	1800	2100	2400	2700	3000	3300	3600	3900	4200	4500	4800
12½	625	940	1250	1560	1875	2190	2500	2820	3125	3440	3750	4070	4375	4690	5000
13	650	980	1300	1625	1950	2280	2600	2930	3250	3580	3900	4240	4550	4880	5200
13½	675	1010	1350	1690	2025	2360	2700	3040	3375	3720	4050	4400	4725	5060	5400
14	700	1050	1400	1750	2100	2450	2800	3160	3500	3860	4200	4550	4900	5250	5600
14½	725	1085	1450	1810	2175	2540	2900	3260	3625	4000	4350	4700	5075	5440	5800
15	750	1125	1500	1880	2250	2620	3000	3380	3750	4140	4500	4880	5250	5625	6000

Height of  
Ceilings

Full Area of Two-Pane Windows																										Giving the total area of Two-Pane Windows, including the Sash												Table of Square Feet of Wall Surface required for Heating																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
Width In.	Width of Open Ft. In.	Height Glass	Height Open g	18"	20"	22"	24"	26"	28"	30"	32"	34"	36"	38"	40"	42"	44"	46"	48"	50"	52"	54"	Standard Sizes of Two-Light Windows.		18"	20"	22"	24"	26"	28"	30"	32"	34"	36"	38"	40"	42"	44"	46"	48"	50"	52"	54"																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
				3'-6"	3'-10"	4'-2"	4'-6"	4'-10"	5'-2"	5'-6"	5'-10"	6'-2"	6'-6"	6'-10"	7'-2"	7'-6"	7'-10"	8'-2"	8'-6"	8'-10"	9'-2"	9'-6"	9'-10"	10'-2"	10'-6"	10'-10"	11'-2"	11'-6"	11'-10"	12'-2"	12'-6"	12'-10"	13'-2"	13'-6"	13'-10"	14'-2"	14'-6"	14'-10"	15'-2"	15'-6"	15'-10"	16'-2"	16'-6"	16'-10"	17'-2"	17'-6"	17'-10"	18'-2"	18'-6"	18'-10"	19'-2"	19'-6"	19'-10"	20'-2"	20'-6"	20'-10"	21'-2"	21'-6"	21'-10"	22'-2"	22'-6"	22'-10"	23'-2"	23'-6"	23'-10"	24'-2"	24'-6"	24'-10"	25'-2"	25'-6"	25'-10"	26'-2"	26'-6"	26'-10"	27'-2"	27'-6"	27'-10"	28'-2"	28'-6"	28'-10"	29'-2"	29'-6"	29'-10"	30'-2"	30'-6"	30'-10"	31'-2"	31'-6"	31'-10"	32'-2"	32'-6"	32'-10"	33'-2"	33'-6"	33'-10"	34'-2"	34'-6"	34'-10"	35'-2"	35'-6"	35'-10"	36'-2"	36'-6"	36'-10"	37'-2"	37'-6"	37'-10"	38'-2"	38'-6"	38'-10"	39'-2"	39'-6"	39'-10"	40'-2"	40'-6"	40'-10"	41'-2"	41'-6"	41'-10"	42'-2"	42'-6"	42'-10"	43'-2"	43'-6"	43'-10"	44'-2"	44'-6"	44'-10"	45'-2"	45'-6"	45'-10"	46'-2"	46'-6"	46'-10"	47'-2"	47'-6"	47'-10"	48'-2"	48'-6"	48'-10"	49'-2"	49'-6"	49'-10"	50'-2"	50'-6"	50'-10"	51'-2"	51'-6"	51'-10"	52'-2"	52'-6"	52'-10"	53'-2"	53'-6"	53'-10"	54'-2"	54'-6"	54'-10"	55'-2"	55'-6"	55'-10"	56'-2"	56'-6"	56'-10"	57'-2"	57'-6"	57'-10"	58'-2"	58'-6"	58'-10"	59'-2"	59'-6"	59'-10"	60'-2"	60'-6"	60'-10"	61'-2"	61'-6"	61'-10"	62'-2"	62'-6"	62'-10"	63'-2"	63'-6"	63'-10"	64'-2"	64'-6"	64'-10"	65'-2"	65'-6"	65'-10"	66'-2"	66'-6"	66'-10"	67'-2"	67'-6"	67'-10"	68'-2"	68'-6"	68'-10"	69'-2"	69'-6"	69'-10"	70'-2"	70'-6"	70'-10"	71'-2"	71'-6"	71'-10"	72'-2"	72'-6"	72'-10"	73'-2"	73'-6"	73'-10"	74'-2"	74'-6"	74'-10"	75'-2"	75'-6"	75'-10"	76'-2"	76'-6"	76'-10"	77'-2"	77'-6"	77'-10"	78'-2"	78'-6"	78'-10"	79'-2"	79'-6"	79'-10"	80'-2"	80'-6"	80'-10"	81'-2"	81'-6"	81'-10"	82'-2"	82'-6"	82'-10"	83'-2"	83'-6"	83'-10"	84'-2"	84'-6"	84'-10"	85'-2"	85'-6"	85'-10"	86'-2"	86'-6"	86'-10"	87'-2"	87'-6"	87'-10"	88'-2"	88'-6"	88'-10"	89'-2"	89'-6"	89'-10"	90'-2"	90'-6"	90'-10"	91'-2"	91'-6"	91'-10"	92'-2"	92'-6"	92'-10"	93'-2"	93'-6"	93'-10"	94'-2"	94'-6"	94'-10"	95'-2"	95'-6"	95'-10"	96'-2"	96'-6"	96'-10"	97'-2"	97'-6"	97'-10"	98'-2"	98'-6"	98'-10"	99'-2"	99'-6"	99'-10"	100'-2"	100'-6"	100'-10"	101'-2"	101'-6"	101'-10"	102'-2"	102'-6"	102'-10"	103'-2"	103'-6"	103'-10"	104'-2"	104'-6"	104'-10"	105'-2"	105'-6"	105'-10"	106'-2"	106'-6"	106'-10"	107'-2"	107'-6"	107'-10"	108'-2"	108'-6"	108'-10"	109'-2"	109'-6"	109'-10"	110'-2"	110'-6"	110'-10"	111'-2"	111'-6"	111'-10"	112'-2"	112'-6"	112'-10"	113'-2"	113'-6"	113'-10"	114'-2"	114'-6"	114'-10"	115'-2"	115'-6"	115'-10"	116'-2"	116'-6"	116'-10"	117'-2"	117'-6"	117'-10"	118'-2"	118'-6"	118'-10"	119'-2"	119'-6"	119'-10"	120'-2"	120'-6"	120'-10"	121'-2"	121'-6"	121'-10"	122'-2"	122'-6"	122'-10"	123'-2"	123'-6"	123'-10"	124'-2"	124'-6"	124'-10"	125'-2"	125'-6"	125'-10"	126'-2"	126'-6"	126'-10"	127'-2"	127'-6"	127'-10"	128'-2"	128'-6"	128'-10"	129'-2"	129'-6"	129'-10"	130'-2"	130'-6"	130'-10"	131'-2"	131'-6"	131'-10"	132'-2"	132'-6"	132'-10"	133'-2"	133'-6"	133'-10"	134'-2"	134'-6"	134'-10"	135'-2"	135'-6"	135'-10"	136'-2"	136'-6"	136'-10"	137'-2"	137'-6"	137'-10"	138'-2"	138'-6"	138'-10"	139'-2"	139'-6"	139'-10"	140'-2"	140'-6"	140'-10"	141'-2"	141'-6"	141'-10"	142'-2"	142'-6"	142'-10"	143'-2"	143'-6"	143'-10"	144'-2"	144'-6"	144'-10"	145'-2"	145'-6"	145'-10"	146'-2"	146'-6"	146'-10"	147'-2"	147'-6"	147'-10"	148'-2"	148'-6"	148'-10"	149'-2"	149'-6"	149'-10"	150'-2"	150'-6"	150'-10"	151'-2"	151'-6"	151'-10"	152'-2"	152'-6"	152'-10"	153'-2"	153'-6"	153'-10"	154'-2"	154'-6"	154'-10"	155'-2"	155'-6"	155'-10"	156'-2"	156'-6"	156'-10"	157'-2"	157'-6"	157'-10"	158'-2"	158'-6"	158'-10"	159'-2"	159'-6"	159'-10"	160'-2"	160'-6"	160'-10"	161'-2"	161'-6"	161'-10"	162'-2"	162'-6"	162'-10"	163'-2"	163'-6"	163'-10"	164'-2"	164'-6"	164'-10"	165'-2"	165'-6"	165'-10"	166'-2"	166'-6"	166'-10"	167'-2"	167'-6"	167'-10"	168'-2"	168'-6"	168'-10"	169'-2"	169'-6"	169'-10"	170'-2"	170'-6"	170'-10"	171'-2"	171'-6"	171'-10"	172'-2"	172'-6"	172'-10"	173'-2"	173'-6"	173'-10"	174'-2"	174'-6"	174'-10"	175'-2"	175'-6"	175'-10"	176'-2"	176'-6"	176'-10"	177'-2"	177'-6"	177'-10"	178'-2"	178'-6"	178'-10"	179'-2"	179'-6"	179'-10"	180'-2"	180'-6"	180'-10"	181'-2"	181'-6"	181'-10"	182'-2"	182'-6"	182'-10"	183'-2"	183'-6"	183'-10"	184'-2"	184'-6"	184'-10"	185'-2"	185'-6"	185'-10"	186'-2"	186'-6"	186'-10"	187'-2"	187'-6"	187'-10"	188'-2"	188'-6"	188'-10"	189'-2"	189'-6"	189'-10"	190'-2"	190'-6"	190'-10"	191'-2"	191'-6"	191'-10"	192'-2"	192'-6"	192'-10"	193'-2"	193'-6"	193'-10"	194'-2"	194'-6"	194'-10"	195'-2"	195'-6"	195'-10"	196'-2"	196'-6"	196'-10"	197'-2"	197'-6"	197'-10"	198'-2"	198'-6"	198'-10"	199'-2"	199'-6"	199'-10"	200'-2"	200'-6"	200'-10"	201'-2"	201'-6"	201'-10"	202'-2"	202'-6"	202'-10"	203'-2"	203'-6"	203'-10"	204'-2"	204'-6"	204'-10"	205'-2"	205'-6"	205'-10"	206'-2"	206'-6"	206'-10"	207'-2"	207'-6"	207'-10"	208'-2"	208'-6"	208'-10"	209'-2"	209'-6"	209'-10"	210'-2"	210'-6"	210'-10"	211'-2"	211'-6"	211'-10"	212'-2"	212'-6"	212'-10"	213'-2"	213'-6"	213'-10"	214'-2"	214'-6"	214'-10"	215'-2"	215'-6"	215'-10"	216'-2"	216'-6"	216'-10"	217'-2"	217'-6"	217'-10"	218'-2"	218'-6"	218'-10"	219'-2"	219'-6"	219'-10"	220'-2"	220'-6"	220'-10"	221'-2"	221'-6"	221'-10"	222'-2"	222'-6"	222'-10"	223'-2"	223'-6"	223'-10"	224'-2"	224'-6"	224'-10"	225'-2"	225'-6"	225'-10"	226'-2"	226'-6"	226'-10"	227'-2"	227'-6"	227'-10"	228'-2"	228'-6"	228'-10"	229'-2"	229'-6"	229'-10"	230'-2"	230'-6"	230'-10"	231'-2"	231'-6"	231'-10"	232'-2"	232'-6"	232'-10"	233'-2"	233'-6"	233'-10"	234'-2"	234'-6"	234'-10"	235'-2"	235'-6"	235'-10"	236'-2"	236'-6"	236'-10"	237'-2"	237'-6"	237'-10"	238'-2"	238'-6"	238'-10"	239'-2"	239'-6"	239'-10"	240'-2"	240'-6"	240'-10"	241'-2"	241'-6"	241'-10"	242'-2"	242'-6"	242'-10"	243'-2"	243'-6"	243'-10"	244'-2"	244'-6"	244'-10"	245'-2"	245'-6"	245'-10"	246'-2"	246'-6"	246'-10"	247'-2"	247'-6"	247'-10"	248'-2"	248'-6"	248'-10"	249'-2"	249'-6"	249'-10"	250'-2"	250'-6"	250'-10"	251'-2"	251'-6"	251'-10"	252'-2"	252'-6"	252'-10"	253'-2"	253'-6"	253'-10"	254'-2"	254'-6"	254'-10"	255'-2"	255'-6"	255'-10"	256'-2"	256'-6"	256'-10"	257'-2"	257'-6"	257'-10"	258'-2"	258'-6"	258'-10"	259'-2"	259'-6"	259'-10"	260'-2"	260'-6"	260'-10"	261'-2"	261'-6"	261'-10"	262'-2"	262'-6"	262'-10"	263'-2"	263'-6"	263'-10"	264'-2"	264'-6"	264'-10"	265'-2"	265'-6"	265'-10"	266'-2"	266'-6"	266'-10"	267'-2"	267'-6"	267'-10"	268'-2"	268'-6"	268'-10"	269'-2"	269'-6"	269'-10"	270'-2"	270'-6"	270'-10"	271'-2"	271'-6"	271'-10"	272'-2"	272'-6"	272'-10"	273'-2"	273'-6"	273'-10"	274'-2"	274'-6"	274'-10"	275'-2"	275'-6"	275'-10"	276'-2"	276'-6"	276'-10"	277'-2"	277'-6"	277'-10"	278'-2"	278'-6"	278'-10"	279'-2"	279'-6"	279'-10"	280'-2"	280'-6"	280'-10"	281'-2"	281'-6"	281'-10"	282'-2"	282'-6"	282'-10"	283'-2"	283'-6"	283'-10"	284'-2"	284'-6"	284'-10"	285'-2"	285'-6"	285'-10"	286'-2"	286'-6"	286'-10"	287'-2"	287'-6"	287'-10"	288'-2"	288'-6"	288'-10"	289'-2"	289'-6"	289'-10"	290'-2"	290'-6"	290'-10"	291'-2"	291'-6"	291'-10"	292'-2"	292'-6"	292'-10"	293'-2"	293'-6"	293'-10"	294'-2"	294'-6"	294'-10"	295'-2"	295'-6"	295'-10"	296'-2"	296'-6"	296'-10"	297'-2"	297'-6"	297'-10"	298'-2"	298'-6"	298'-10"	299'-2"	299'-6"	299'-10"	300'-2"	300'-6"	300'-10"	301'-2"	301'-6"	301'-10"	302'-2"	302'-6"	302'-10"	303'-2"	303'-6"	303'-10"	304'-2"	304'-6"	304'-10"	305'-2"	305'-6"	305'-10"	306'-2"	306'-6"	306'-10"	307'-2"	307'-6"	307'-10"	308'-2"	308'-6"	308'-10"	309'-2"	309'-6"	309'-10"	310'-2"	310'-6"	310'-10"	311'-2"	311'-6"	311'-10"	312'-2"	312'-6"	312'-10"	313'-2"	313'-6"	313'-10"	314'-2"	314'-6"	314'-10"	315'-2"	315'-6"	315'-10"	316'-2"	316'-6"	316'-10"	317'-2"	317'-6"	317'-10"	318'-2"	318'-6"	318'-10"	319'-2"	319'-6"	319'-10"	320'-2"	320'-6"	320'-10"	321'-2"	321'-6"	321'-10"	322'-2"	322'-6"	322'-10"	323'-2"	323'-6"	323'-10"	324'-2"	324'-6"	324'-10"	325'-2"	325'-6"	325'-10"	326'-2"	326'-6"	326'-10"	327'-2"	327'-6"	327'-10"	328'-2"	328'-6"	328'-10"	329'-2"	329'-6"	329'-10"	330'-2"	330'-6"	330'-10"	331'-2"	331'-6"	331'-10"	332'-2"	332'-6"	332'-10"	333'-2"	333'-6"	333'-10"	334'-2"	334'-6"	334'-10"	335'-2"	335'-6"	335'-10"	336'-2"	336'-6"	336'-10"	337'-2"	337'-6"	337'-10"	338'-2"	338'-6"	338'-10"	339'-2"	339'-6"	339'-10"	340'-2"	340'-6"	340'-10"	341'-2"	341'-6"	341'-10"	342'-2"	342'-6"	342'-10"	343'-2"	343'-6"	343'-10"	344'-2"	344'-6"	344'-10"	345'-2"	345'-6"	345'-10"	346'-2"	346'-6"	346'-10"	347'-2"	347'-6"	347'-10"	348'-2"	348'-6"	348'-10"	349'-2"	349'-6"	349'-10"	350'-2"	350'-6"	350'-10"	351'-2"	351'-6"	351'-10"	352'-2"	352'-6"	352'-10"	353'-2"	353'-6"	353'-10"	354'-2"	354'-6"	354'-10"	355'-2"	355'-6"	355'-10"	356'-2"	356'-6"	356'-10"	357'-2"	357'-6"	357'-10"	358'-2"	358'-6"	358'-10"	359'-2"	359'-6"	359'-10"	360'-2"	360'-6"	360'-10"	361'-2"	361'-6"	361'-10"	362'-2"	362'-6"	362'-10"	363'-2"	363'-6"	363'-10"	364'-2"	364'-6"	364'-10"	365'-2"	365'-6"	365'-10"	366'-2"	366'-6"	366'-10"	367'-2"	367'-6"	367'-10"	368'-2"	368'-6"	368'-10"	369'-2"	369'-6"	369'-10"	370'-2"	370'-6"	370'-10"	371'-2"	371'-6"	371'-10"	372'-2"	372'-6"	372'-10"	373'-2"	373'-6"	373'-10"	374'-2"	374'-6"	374'-10"	375'-2"	375'-6"	375'-10"	376'-2"	376'-6"	376'-10"	377'-2"	377'-6"	377'-10"	378'-2"	378'-6"	378'-10"	379'-2"	379'-6"	379'-10"	380'-2"	380'-6"	380'-10"	381'-2"	381'-6"	381'-10"	382'-2"	382'-6"	382'-10"	383'-2"	383'-6"	383'-10"	384'-2"	384'-6"	384'-10"	385'-2"	385'-6"	385'-10"	386'-2"	386'-6"	386'-10"	387'-2"	387'-6"	387'-10"	388'-2"	388'-6"	388'-10"	389'-2"	389'-6"	389'-10"	390'-2"	390'-6"	390'-10"	391'-2"	391'-6"	391'-10"	392'-2"	392'-6"	392'-10"	393'-2"	393'-6"	393'-10"	394'-2"	394'-6"	394'-10"	395'-2"	395'-6"	395'-10"	396'-2"	396'-6"	396'-10"	397'-2"	397'-6"	397'-10"	398'-2"



# Table of Square Feet of Wall Surface ordinarily found in House Heating

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RUNNING FEET OF EXPOSED WALL WITHOUT REGARD TO WINDOW OPENINGS																				
6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.	23.	24.		
48	56	64	72	80	88	96	104	112	120	128	136	144	152	160	168	176	184	192		
51	60	68	76	85	94	102	110	119	127	136	145	153	162	170	178	187	195	204		
54	63	72	81	90	99	108	117	126	135	144	153	162	171	180	189	198	207	216		
57	66	76	86	95	105	114	123	133	142	152	161	171	181	190	200	209	218	228		
60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240		
63	73	84	94	105	115	126	136	147	157	168	178	189	199	210	220	231	242	252		
66	77	88	99	110	121	132	143	154	165	176	187	198	209	220	231	242	253	264		
69	80	92	104	115	126	138	149	161	172	184	195	207	218	230	241	253	265	276		
72	84	96	108	120	132	144	156	168	180	192	204	216	228	240	252	264	276	288		
75	87	100	112	125	137	150	162	175	187	200	212	225	238	250	262	275	287	300		
78	91	104	117	130	143	156	169	181	195	208	221	234	247	260	273	286	299	312		
84	98	112	126	140	154	168	182	196	210	224	238	252	266	280	294	308	322	336		
25.	26.	27.	28.	29.	30.	31.	32.	33.	34.	35.	36.	37.	38.	39.	40.	41.	42.	43.		
200	208	216	224	232	240	248	256	264	272	280	288	296	304	312	320	328	336	344		
212	221	230	238	246	255	263	272	280	289	298	306	315	323	332	340	349	357	366		
225	234	243	252	261	270	279	288	297	306	315	324	333	342	351	360	369	378	387		
237	247	256	266	275	285	294	304	313	323	332	342	351	361	370	380	389	399	408		
250	260	270	280	290	300	310	320	330	340	350	360	370	380	390	400	410	420	430		
262	273	283	294	305	315	325	336	346	357	367	378	388	399	409	420	430	441	451		
275	286	297	308	319	330	341	352	363	374	385	396	407	418	429	440	451	462	473		
287	299	310	322	333	345	356	368	379	391	403	414	426	437	449	460	471	483	494		
300	312	324	336	348	360	372	384	396	408	420	432	444	456	468	480	492	504	516		
312	325	337	350	362	375	387	400	412	425	437	450	462	475	487	500	512	525	537		
325	338	351	364	377	390	403	416	429	442	455	468	481	494	507	520	533	546	559		
350	364	378	392	406	420	434	448	462	476	490	504	518	532	546	560	574	588	602		
Height of Ceiling																				
8																				
8½																				
9																				
9½																				
10																				
10½																				
11																				
11½																				
12																				
12½																				
13																				
14																				
Height of Ceiling																				
8																				
8½																				
9																				
9½																				
10																				
10½																				
11																				
11½																				
12																				
12½																				
13																				
14																				

# Areas of Circles

Size	Area	Size	Area	Size	Area	Size	Area
$\frac{1}{8}$	0.0123	10	78.54	30	706.86	65	3318.3
$\frac{1}{4}$	0.0491	$\frac{1}{2}$	86.59	31	754.76	66	3421.2
$\frac{3}{8}$	0.1104	11	95.03	32	804.24	67	3525.6
$\frac{1}{2}$	0.1963	$\frac{1}{2}$	103.86	33	855.30	68	3631.6
$\frac{5}{8}$	0.3067	12	113.09	34	907.92	69	3739.2
$\frac{3}{4}$	0.4417	$\frac{1}{2}$	122.71	35	962.11	70	3848.4
$\frac{7}{8}$	0.6013	13	132.73	36	1017.8	71	3959.2
1	0.7854	$\frac{1}{2}$	143.13	37	1075.2	72	4071.5
$\frac{1}{8}$	0.9940	14	153.93	38	1134.1	73	4185.3
$\frac{1}{4}$	1.227	$\frac{1}{2}$	165.13	39	1194.5	74	4300.8
$\frac{3}{8}$	1.484	15	176.71	40	1256.6	75	4417.8
$\frac{1}{2}$	1.767	$\frac{1}{2}$	188.69	41	1320.2	76	4536.4
$\frac{5}{8}$	2.073	16	201.06	42	1385.4	77	4656.0
$\frac{3}{4}$	2.405	$\frac{1}{2}$	213.82	43	1452.2	78	4778.3
$\frac{7}{8}$	2.761	17	226.98	44	1520.5	79	4901.6
2	3.141	$\frac{1}{2}$	240.52	45	1590.4	80	5026.5
$\frac{1}{4}$	3.976	18	254.46	46	1661.9	81	5153.0
$\frac{1}{2}$	4.908	$\frac{1}{2}$	268.80	47	1734.9	82	5281.0
$\frac{3}{4}$	5.939	19	283.52	48	1809.5	83	5410.6
3	7.068	$\frac{1}{2}$	298.64	49	1885.7	84	5541.7
$\frac{1}{4}$	8.295	20	314.16	50	1963.5	85	5674.5
$\frac{1}{2}$	9.621	$\frac{1}{2}$	330.06	51	2042.8	86	5808.8
$\frac{3}{4}$	11.044	21	346.36	52	2123.7	87	5944.6
4	12.566	$\frac{1}{2}$	363.05	53	2206.1	88	6082.1
$\frac{1}{2}$	15.904	22	380.13	54	2290.2	89	6221.1
5	19.635	$\frac{1}{2}$	397.60	55	2375.8	90	6361.7
$\frac{1}{2}$	23.758	23	415.47	56	2463.0	91	6503.8
6	28.274	$\frac{1}{2}$	433.73	57	2551.7	92	6647.6
$\frac{1}{2}$	33.183	24	452.39	58	2642.0	93	6792.9
7	38.484	$\frac{1}{2}$	471.43	59	2733.9	94	6939.7
$\frac{1}{2}$	44.178	25	490.87	60	2827.4	95	7088.2
8	50.265	26	530.93	61	2922.4	96	7238.2
$\frac{1}{2}$	56.745	27	572.55	62	3019.0	97	7389.8
9	63.617	28	615.75	63	3117.2	98	7542.9
$\frac{1}{2}$	70.882	29	660.52	64	3216.9	99	7697.7

To find the diameter of a circle when circumference is given, multiply the given circumference by .3183

# Circumference of Circles

Size	Circumference	Size	Circumference	Size	Circumference	Size	Circumference
$\frac{1}{8}$	3.927	10	31.416	30	94.248	65	204.204
$\frac{1}{4}$	7.854	$\frac{1}{2}$	32.987	31	97.389	66	207.345
$\frac{3}{8}$	1.1781	11	34.558	32	100.531	67	210.487
$\frac{1}{2}$	1.5708	$\frac{1}{2}$	36.128	33	103.673	68	213.628
$\frac{5}{8}$	1.9635	12	37.699	34	106.814	69	216.770
$\frac{3}{4}$	2.3562	$\frac{1}{2}$	39.270	35	109.956	70	219.911
$\frac{7}{8}$	2.7489	13	40.841	36	113.097	71	223.053
1	3.1416	$\frac{1}{2}$	42.412	37	116.239	72	226.195
$\frac{1}{8}$	3.5343	14	43.982	38	119.381	73	229.336
$\frac{1}{4}$	3.9270	$\frac{1}{2}$	45.553	39	122.522	74	232.478
$\frac{3}{8}$	4.3197	15	47.124	40	125.664	75	235.619
$\frac{1}{2}$	4.7124	$\frac{1}{2}$	48.695	41	128.805	76	238.761
$\frac{5}{8}$	5.1051	16	50.265	42	131.947	77	241.903
$\frac{3}{4}$	5.4978	$\frac{1}{2}$	51.836	43	135.088	78	245.044
$\frac{7}{8}$	5.8905	17	53.407	44	138.230	79	248.186
2	6.2832	$\frac{1}{2}$	54.978	45	141.372	80	251.327
$\frac{1}{4}$	7.0686	18	56.549	46	144.513	81	254.469
$\frac{1}{2}$	7.8540	$\frac{1}{2}$	58.119	47	147.655	82	257.611
$\frac{3}{4}$	8.6394	19	59.690	48	150.796	83	260.752
3	9.4248	$\frac{1}{2}$	61.261	49	153.938	84	263.894
$\frac{1}{4}$	10.210	20	62.832	50	157.080	85	267.035
$\frac{1}{2}$	10.996	$\frac{1}{2}$	64.403	51	160.221	86	270.177
$\frac{3}{4}$	11.781	21	65.973	52	163.363	87	273.319
4	12.566	$\frac{1}{2}$	67.544	53	166.504	88	276.460
$\frac{1}{2}$	14.137	22	69.115	54	169.646	89	279.602
5	15.708	$\frac{1}{2}$	70.686	55	172.788	90	282.743
$\frac{1}{2}$	17.279	23	72.257	56	175.929	91	285.885
6	18.850	$\frac{1}{2}$	73.827	57	179.071	92	289.027
$\frac{1}{2}$	20.420	24	75.398	58	182.212	93	292.168
7	21.991	$\frac{1}{2}$	76.969	59	185.354	94	295.310
$\frac{1}{2}$	23.562	25	78.540	60	188.496	95	298.451
8	25.133	26	81.681	61	191.637	96	301.593
$\frac{1}{2}$	26.704	27	84.823	62	194.779	97	304.734
9	28.274	28	87.965	63	197.920	98	307.876
$\frac{1}{2}$	29.845	29	91.106	64	201.062	99	311.018

To find the circumference of a circle when diameter is given, multiply the given diameter by 3.1416.



# Chimney Flues

The selection of chimney flues for Heating Boilers must depend upon the judgment of the Heating Engineer. No tabular statements can be guaranteed, but it is believed that the table herewith, of Prof. R. C. Carpenter, when used in connection with the size of smoke pipes given for each IDEAL Boiler, will very much assist the engineer in selecting flues.

It is necessary that area and HEIGHT, thickness of walls, general structure, and the position of the top outlet with reference to the building and other buildings nearby, should be carefully noted and observed in selecting or building a flue.

The figures given under the varying heights of chimneys are diameter measurements in inches, or, the side of a square—the theory being that the spiral ascending column of smoke and gases will make a twelve-by-twelve inch flue no more extensive in practical working area than a twelve-inch round flue. Rectangular shapes may be used if the area is equal and the difference in width and length are not extreme.

DIRECT RADIATION *		HEIGHT OF CHIMNEY FLUE					
Steam in Square Ft.	Water in Square Ft.	20 ft.	30 ft.	40 ft.	50 ft.	60 ft.	80 ft.
250	375	7.4	7.0	6.7	6.4	6.2	6.0
500	750	9.6	9.2	8.8	8.2	8.0	6.6
750	1150	11.3	10.8	10.2	9.6	9.3	8.8
1000	1500	12.8	12.0	11.4	10.8	10.5	10.0
1500	2250	15.2	14.4	13.4	12.8	12.4	11.5
2000	3000	17.2	16.3	15.2	14.5	14.0	13.2
3000	4500	20.6	18.5	18.2	17.2	16.6	15.8
4000	6000	23.6	22.2	20.8	19.6	19.0	17.8
5000	7500	26.0	24.6	23.0	21.6	21.0	19.4
6000	9000	28.4	26.8	25.0	23.4	22.8	21.2
7000	10500	30.4	28.8	27.0	25.5	24.4	23.0
8000	12000	32.4	30.6	28.6	26.8	26.0	24.2
9000	13500	34.0	32.4	30.4	28.4	27.4	25.6
10000	15000	37.0	34.0	32.0	30.0	28.6	27.0

\*NOTE.—When a considerable amount of INDIRECT radiation is to be used, increased Boiler capacity is necessary, and in many cases such demands require a larger chimney flue for same number of square feet of radiation used.

## A Less Specific Rule for Chimney Flues

Herewith is a table of chimney flue sizes which is commonly used with good results. It does not take into consideration varying heights of stacks, but is said to be reliable in average conditions.

DIRECT RADIATION *		SIZE OF FLUE	
Steam in Square Feet	Water in Square Feet	Round	Square
250	400	8	8 x 8
300	500	8	8 x 8
400	700	8	8 x 8
500	850	10	8 x 12
600	1000	10	8 x 12
700	1200	10	8 x 12
800	1350	12	12 x 12
900	1500	12	12 x 12
1000	1700	12	12 x 12
1200	2100	12	12 x 12
1400	2400	14	12 x 16
1600	2700	14	12 x 16
1800	3000	14	12 x 16
2000	3400	14	12 x 16
2200	3700	16	16 x 16
3000	5100	16	16 x 16
3500	5900	18	16 x 20
5000	8500	18	16 x 20

\*NOTE.—When a considerable amount of INDIRECT radiation is to be used, increased Boiler capacity is necessary, and in many cases such demands require a larger chimney flue for same number of square feet of radiation used.

# The Ordinary Chimney Flue

## For Hard Coal

The area of the flue should never be less than 9 or 10 inches round, or 8 x 12 rectangular—unless for a very small heating Boiler or Tank Heater, when an 8-inch round or 8 x 8 square flue will answer, if high enough. The flue should have a little more area than that of the smoke-pipe. There is less friction in a round-tile flue than in the square form, for the spiral ascent of the draft moves in the easiest manner.

The value of the flue depends on volume of passage due to area, and velocity due to height. Velocity alone is no proof of good draft—there must be also sufficient area to carry the smoke.

The chimney-top should run above the highest part of the roof and should, if possible, be not less than 35 feet in height. Where it is not possible to get this height, arrangements should be made to increase the area. The chimney should be so located with reference to any higher buildings nearby that wind-currents will not form eddies and force the air downward in the shaft. A shifting cowl, which will always turn the outlet away from the adverse currents, will promote better draft.

The flue should run as nearly straight up from the base to the top outlet as possible. It should have no other openings into it but the Boiler smoke-pipe. Sharp bends and offsets in the flue will often reduce the area and choke the draft. The flue must be free of any feature which prevents a free area for the passage of smoke. The outlet must not be capped so that the area of the outlet is less than the area of the flue.

If the flue is made of round tile the joints must be tightly cemented, or all space between the tile and brick-work filled in tightly. There must be no open crevices into the flue where the sections lap—otherwise the draft is checked.

If the flue is made of brick only, the stack should be at least two four-inch courses in thickness. The inside should be smooth.

If there is a soot-pocket in the flue below the smoke-pipe opening, the clean-out door should always be closed. If this soot-pocket has other openings in it—from fire-places or other connections—they check the draft and prevent best action in the Boiler.



## The Ordinary Chimney Flue—Continued

### For Hard Coal

The smoke-pipe should not extend into the flue beyond the inside surface of the flue, otherwise the end of the pipe cuts down the area of the flue and injures its drawing capacity. The joints, where the smoke-pipe fits the smoke-hood of the Boiler, or where the pipe enters the chimney, should be made tight with boiler putty or asbestos cement.

It will be evident in localities which are situated at considerable height above sea-level that, on account of rarefied air, a larger volume must be supplied in order to furnish the proper amount of oxygen necessary for good combustion. As it is further evident that the height of chimney is in a measure limited, the area, therefore, must be increased to care for the increased volume of combustion gases.

### For Soft Coal

It will be admitted that a chimney of a given height and flue area cannot be equally efficient with all grades of fuel and with all types of Boilers. Generally speaking, all the factors referred to in the foregoing statements apply to all kinds of fuels. But some extra consideration must be given to the flue which is to supply draft to the Steam or Water Boiler that is to be operated with soft coals, especially in regard to areas.

Where soft coal is to be used, the ratio of its heating effect as compared with anthracite coal should be determined, and in building the flue its area should be *increased* in proportion as the heating effect *decreases*.

Theoretically, anthracite fuel requires a greater intensity of draft than do the soft or bituminous coals; but on account of the greater proportion of gaseous products of combustion, the flue area must be larger for burning soft coal than for anthracite. Practically, the height of the flue obtainable is generally the same, so that the area of the flue must be somewhat larger for soft coal, and in most cases the increase of area should be about  $33\frac{1}{3}\%$ . In other words, a flue 8x12 inches, suitable for hard coal, should be increased to not less than 10x12 inches for soft coal; or, a tile-lined flue made of 12x12-inch materials (which would actually measure inside 11x11 inches) can be used.

Accumulations of oil, grease or grit in a new system causes a Boiler to foam, prevents generation of steam, and produces an unsteady water line; therefore it is necessary to blow off Boiler under pressure. This should be done within a week after the Boiler is installed and in operation. If one blowing off does not result in a clean water-gauge glass, proper generation of steam and a steady water line, the Boiler should be blown off a second, and if necessary a third time. This rule will produce good results:—

## When Water Supply Pressure is Available

Remove the safety valve from the Boiler and connect a blow-off pipe to the opening, extending the pipe to the outside of the building or to some suitable drain. The size of this pipe should be as follows:—

Boilers rated from	600 sq. ft. to 1200 sq. ft.	$\frac{3}{4}$ -in. pipe.
“ “ “	1200 “ “ 2500 “	1 -in. “
“ “ “	2500 “ “ 4500 “	$1\frac{1}{4}$ -in. “
“ “ “	larger than 4500 sq. ft.	$1\frac{1}{2}$ -in. “

A  $\frac{3}{4}$ -inch garden hose is of sufficient capacity for a Boiler of about 800 square feet.

Close off all the Radiator valves connected with the system, or if the main flow and return pipes are equipped with gate valves, these valves may be closed in place of closing the Radiator valves.

Fill the Boiler to the top of gauge glass with water. Build hot fire in Boiler and blow water and steam out through the safety valve tapping and pipe above referred to. Maintain as much steam pressure as possible in Boiler up to 20 pounds, as indicated on steam gauge. Supply cold water in the bottom of the Boiler and maintain water line at top of gauge glass or at a point which will permit the steam to siphon water and grease from the surface of the water in Boiler. Continue the blowing for about two hours. Then close off the water feed valve and drain the water through the draw-off down to the proper water line in the Boiler.

Remove the blow-off pipe and replace the safety valve. Open up the Radiator valves or the gate valves on the flow and return pipes, as the case may be, and then the heating outfit is ready for operation with the Boiler thoroughly cleaned inside.

## To Properly Erect Sectional Boilers

Set up and bolt together squarely the four pieces comprising the base, on a level brick or concrete foundation which is at least a foot larger all round than the base.

On the 15- and 48-inch Boilers place all of the grates in position and connect them to the horizontal shaking bar underneath them. Connect this bar through the front of the base to the angle shaking lever, which is fastened to the front section by means of a bracket.

Place on top of the base, and close up against the base front the front section, which is marked No. 1. Wipe clean its three nipple holes, also any three of the connecting nipples; smear them with good lubricating oil (do not use red lead or white lead or any other pipe-joint paste); place them in the front section; add the second section marked No. 2, after having carefully wiped clean its six nipple holes, pushing the section up until its front nipple holes register with the nipples already placed in the front section. Jar section No. 2 up close to the first one with a piece of timber. Place the four long connecting bolts in their holes, slipping on each, at the rear, one of the square wood washers which we supply. Screw up equally all around, meanwhile striking the rear section, in the vicinity of the three connecting holes, with a block of wood and a good heavy hammer.

When the sections are within  $\frac{1}{4}$  or  $\frac{1}{8}$  of an inch of each other (square all around) then insert four wooden wedges, which are to go between each and every section before they are pulled up any further, one on each side just above the lower connecting nipples and two on top. These two as far away from the upper connecting nipple as possible. Then screw a little more on the nuts until the wedges have been bitten by the two sections, and the sections have been drawn together from center to center of each section the following distances:—

15-in. Coal-Burning Boiler  $6\frac{1}{4}$  in. from Center to Center of Sections.

19-in. " " "  $6\frac{5}{8}$  in. " " " " " "

22-in. " " "  $7\frac{1}{8}$  in. " " " " " "

25-in. " " "  $7\frac{1}{2}$  in. " " " " " "

28-in. " " " 8 in. " " " " " "

36-in. " " "  $9\frac{1}{8}$  in. " " " " " "

48-in. " " "  $10\frac{3}{4}$  in. " " " " " "

For 36- and 48-inch Boilers see pamphlet sent with Boiler.



## To Properly Erect Sectional Boilers

(Continued)

Then remove the screw rods, add the next section, precisely as before, and repeat the operation just described, sawing off each time, where they have been marked, a portion of the square wood washers.

If impossible to begin to erect at the front section of boiler, start with the back section, as above described.

As each section is drawn up to the proper center, cement the joint around the flues between the sections.

After Boiler has been assembled complete, be sure to cement all joints (which are all points of contact) between sections, breaking off the wood wedges, allowing their points to remain undisturbed between the sections, applying cement over them. Cement all joints in base and between base and foundation, remembering that all air for combustion should enter only through the draft door.

On the 19-, 22-, 25-, 28-, and 36-inch Boilers, place the grates in position with trunnions in the pocket on the foot of the sections, and the shaking trunnions in the slots in the connecting arm in the base.

Smoke-pipe and all connections between Boiler and flue should be air-tight (a leak in the smoke-pipe or flue is like a leak in a suction pump).

Do not bush the flow outlets in steam dome. Connect all of them to the flow-pipe system, using size of pipe called for by outlets.

Do not expect the Boiler to do good work until the system has been cleared of oil.

A good damper (accessible and easily handled) in smoke-pipe near chimney, provided with means for clamping in order that it may remain where desired, is usually very necessary for draft regulation and fuel saving.

No Boiler will operate successfully on a weak draft, nor will it give satisfaction on a strong draft if the chimney flue area is too small. (Do not mistake velocity for volume. A test by burning paper in a flue proves nothing.)

Each pound of coal requires for its complete combustion about 300 cubic feet of air.

Proper area and height of chimney are essential to draw this amount of air through the grates, ashes, and fuel bed, over various heating surfaces and through flues.

See table Chimney Sizes on page 239.

# How to Clean a Water-Gauge Glass on a Steam Boiler without Removing It

1. Draw a cupful of hot water from the Boiler, into which pour at least a tablespoon of *raw muriatic or other acid*.

2. Close both water-gauge valves.

3. Open top water-gauge valve and also pet cock at bottom, and blow water out of the glass. Then immediately close the top valve and submerge the end of the pet cock in cup of hot-water solution. A vacuum is at once created in the gauge glass which causes the solution in the cup to rush in.

4. Keep the pet cock immersed and operate the top valve, slightly opening and closing, alternately expelling and drawing in the solution until all grease, oil, or other matter adhering to the inside of the glass is cut out. Then close pet cock and *open both water-gauge valves*.

It is necessary to have *one pound pressure of steam or more* on the Boiler before commencing this operation, which need not occupy more than ten minutes. The result is a clean glass without the risk of breakage and probable renewal of gaskets, which is *frequently the case when removing the glass for cleaning*.

## Steam Temperatures Under Vacuum and Pressure

The various degrees of vacuum and pressure and the corresponding boiling temperature of water between 29.92 inches of vacuum and 10 pounds steam pressure are shown in the following table:

Vacuum Gauge inches of Vacuum	Temperature of Steam or Boiling Point of Water	Vacuum Gauge inches of Vacuum	Temperature of Steam or Boiling Point of Water
29.92 ins.	98 deg.	8 ins.	196 deg.
29 "	100 "	7 "	199 "
28 "	102 "	6 "	201 "
27 "	114 "	5 "	203 "
26 "	125 "	4 "	205 "
25 "	133 "	3 "	207 "
24 "	140 "	2 "	208 "
23 "	146 "	1 "	210 "
22 "	152 "	0 "	212 "
21 "	157 "		
20 "	161 "	Steam Gauge Pounds Pressure	
19 "	165 "	1 pound	215 "
18 "	169 "	2 pounds	219 "
17 "	172 "	3 "	222 "
16 "	175 "	4 "	225 "
15 "	178 "	5 "	227 "
14 "	181 "	6 "	230 "
13 "	184 "	7 "	232 "
12 "	186 "	8 "	235 "
11 "	188 "	9 "	237 "
10 "	191 "	10 "	240 "
9 "	194 "		



# Free Area Through Registers

For Calculating Air Passage in Indirect or Hot-Blast Heating

Register Opening	Free Area in Square Feet	Register Opening	Free Area in Square Feet
8 x 8	0.30	18 x 24	2.00
8 x 10	0.37	18 x 27	2.25
8 x 12	0.44	18 x 30	2.50
9 x 12	0.50	18 x 36	3.00
10 x 10	0.46	20 x 20	1.85
10 x 12	0.56	20 x 22	2.04
10 x 14	0.65	20 x 24	2.22
10 x 16	0.74	20 x 26	2.41
10 x 18	0.83	20 x 28	2.59
10 x 20	0.93	20 x 30	2.77
10 x 22	1.02	20 x 32	2.96
10 x 24	1.11	20 x 36	3.33
12 x 12	0.67	24 x 24	2.67
12 x 14	0.78	24 x 27	3.00
12 x 15	0.83	24 x 30	3.33
12 x 16	0.89	24 x 32	3.55
12 x 18	1.00	24 x 36	4.00
12 x 24	1.33	24 x 45	5.00
14 x 14	0.91	27 x 27	3.37
14 x 16	1.04	27 x 38	4.75
14 x 18	1.17	28 x 28	3.63
14 x 20	1.30	28 x 30	3.88
14 x 22	1.43	28 x 32	4.15
16 x 16	1.19	28 x 36	4.66
16 x 18	1.33	30 x 30	4.17
16 x 20	1.48	30 x 36	5.00
16 x 22	1.63	30 x 42	5.83
16 x 24	1.78	30 x 48	6.67
16 x 28	2.07	36 x 36	6.00
16 x 30	2.22	36 x 40	6.67
16 x 32	2.37	36 x 42	7.00
16 x 36	2.67	36 x 48	8.00
18 x 18	1.50	38 x 38	6.67
18 x 20	1.67	38 x 40	7.03
18 x 21	1.75	38 x 42	7.38

## Pipes and Areas for Indirect Heating

The following table from The Engineering Review will provide quick calculations for all cases of indirect heating for residences or any moderate-sized Steam- or Water-heating outfit:—

Dimensions of Pipe	Area in Square Inches	Size of Register Required
8 inches	50	8 x 12
9 "	63	9 x 14
10 "	78	10 x 16
12 "	113	14 x 16
14 "	154	16 x 20
16 "	201	18 x 24
18 "	254	20 x 26
20 "	314	24 x 27
22 "	380	24 x 32
24 "	452	30 x 30

# Siphon Pressure Draft Gauge

Height Water inches	Pres- sure per lb.	Veloc. Feet per sec.	Veloc. Feet per min.	Height Water inches	Pres- sure per lb.	Veloc. Feet per sec.	Veloc. Feet per min.
.1	.521	15.05	903	1.1	5.731	49.9	2994
.2	1.042	21.3	1278	1.2	6.252	52.1	3126
.3	1.563	26.06	1564	1.3	6.773	54.2	3252
.4	2.084	30.1	1806	1.4	7.294	56.3	3378
.5	2.605	33.6	2016	1.5	7.815	58.2	3492
.6	3.126	36.8	2208	1.6	8.336	60.2	3612
.7	3.647	39.8	2388	1.7	8.857	62	3720
.8	4.168	42.5	2550	1.8	9.378	63.8	3828
.9	4.689	45.1	2706	1.9	9.899	65.6	3936
1.0	5.210	47.5	2850	2.	10.420	67.3	4038

## Data Relating to Ventilation

Loss of heat caused by—

*First.* B. t. u. necessary to warm air.

*Second.* B. t. u. absorbed by walls.

*Third.* B. t. u. absorbed by ceiling.

*Fourth.* B. t. u. absorbed by floor.

*Fifth.* B. t. u. absorbed by windows.

Sources of heat in rooms (Schuman, authority):—

*First.* B. t. u. generated by occupants.

*Second.* B. t. u. generated by gas, lamps, or candles.

*Third.* B. t. u. generated by heating apparatus.

An adult requires each hour for respiration and transpiration 215 cubic feet or  $215 \times .077 = 16.5$  pounds, and generates 290 B. T. U. of which 99 units are in the form of vapor and 191 units radiate to surrounding objects.

### Approximate

An adult requires not less than 1800 cubic feet of air per hour.

Each cubic foot gas burned requires 8.5 cubic feet air.

Each pound oil burned requires 150 cubic feet air.

Each pound candles burned requires 160 cubic feet air.

B. t. u. generated by an adult per hour, 191.

B. t. u. generated by burning 1 cubic foot gas, 600.

B. t. u. generated by burning 1 pound oil or candles, 15,000 to 18,000.

Average gas burner consumes approximately 4 cubic feet gas per hour, which equals 2400 B. t. u. per hour.

The average flame from oil lamp 430 to 515 B. t. u. per hour.

The average candle 454 to 545 B. t. u. per hour.

NOTE.—Above information is quoted from standard authorities. Not guaranteed.

# Specifications of Massachusetts District Police, for Heating and Ventilating Public Buildings, Schools, Etc.

(Form No. 83)

1. That the apparatus will, with proper management, heat all the rooms including corridors to 70 degrees in any weather.
2. That with the rooms at 70 degrees and a difference of not less than 40 degrees between the temperature of the outside air and that of the air entering the room at the warm-air inlet, the apparatus will supply at least 30 cubic feet of air per minute for each scholar accommodated in the rooms.
3. That such supply of air will so circulate in the rooms that no uncomfortable draught will be felt, and that the difference in temperature between any two points on the breathing plane (5 feet) in the occupied portion of a room will not exceed 3 degrees.
4. That vitiated air in amount equal to supply from inlets will be removed through the vent ducts.

## Factors for Equivalent Evaporation

Tempera- ture Feed Water	GAUGE PRESSURE		Tempera- ture Feed Water	GAUGE PRESSURE	
	0 to 5 lbs.	5 to 10 lbs.		0 to 5 lbs.	5 to 10 lbs.
32	1.1876	1.1962	113	1.1036	1.1122
35	1.1845	1.1931	116	1.1005	1.1090
38	1.1814	1.1900	119	1.0974	1.1059
41	1.1783	1.1868	122	1.0943	1.1028
44	1.1752	1.1837	125	1.0912	1.0997
47	1.1721	1.1806	128	1.0881	1.0966
50	1.1690	1.1775	131	1.0849	1.0934
53	1.1659	1.1744	134	1.0818	1.0903
56	1.1628	1.1713	137	1.0787	1.0872
59	1.1597	1.1682	140	1.0756	1.0841
62	1.1566	1.1651	143	1.0724	1.0810
65	1.1535	1.1620	146	1.0693	1.0778
68	1.1504	1.1589	149	1.0662	1.0747
71	1.1472	1.1558	152	1.0631	1.0716
74	1.1441	1.1526	155	1.0599	1.0684
77	1.1410	1.1495	158	1.0568	1.0653
80	1.1379	1.1464	161	1.0537	1.0622
83	1.1348	1.1433	164	1.0505	1.0591
86	1.1317	1.1402	167	1.0474	1.0559
89	1.1286	1.1371	170	1.0443	1.0528
92	1.1255	1.1340	173	1.0411	1.0497
95	1.1223	1.1309	176	1.0380	1.0465
98	1.1192	1.1277	179	1.0349	1.0434
101	1.1161	1.1246	182	1.0317	1.0403
104	1.1130	1.1215	185	1.0286	1.0371
107	1.1099	1.1184	188	1.0255	1.0340
110	1.1068	1.1153	191	1.0223	1.0308

The factor of equivalent evaporation means the percentage of difference between the amount of water actually evaporated from a certain temperature of feed water and at a certain definite gauge pressure as compared with feed water 212° and atmospheric pressure.



# Temperatures of Boiling Points Under Various Pressures at Sea Level

Compiled by C. B. Thompson

## Minus Gauge Pressure

Minus Gauge Pressure lbs. per sq. in.	Vacuum Gauge, ins. of Mercury	Tem. F. deg.	Tem. Interval F. deg.	Minus Gauge Pressure lbs. per sq. in.	Vacu'm Gauge ins. of Merc'y	Tem. F. deg.	Tem. Interv'l F. deg.
14.61	29.74	32.0	.....	10.70	21.78	153.1	11.5
14.58	29.67	40.0	8.	9.70	19.74	162.3	9.2
14.52	29.56	50.0	10.	8.70	17.70	170.1	7.8
14.44	29.40	60.0	10.	7.70	15.67	176.9	6.8
14.34	29.19	70.0	10.	6.70	13.63	182.9	6.0
14.20	28.90	80.0	10.	5.70	11.60	188.3	5.4
14.00	28.51	90.0	10.	4.70	9.56	193.2	4.9
13.76	28.00	100.0	10.	3.70	7.52	197.8	4.6
13.70	27.88	102.1	2.1	2.70	5.49	202.0	4.2
12.70	25.85	126.3	24.2	1.70	3.45	205.9	3.9
11.70	23.83	141.6	15.3	0.70	1.41	209.6	3.7

## Plus Gauge Pressure

Gauge Pressure, lbs. per sq. in.	Tem-perature, F. deg.	Tem-perature Interval	Gauge Pressure, lbs. per sq. in.	Tem-perature, F. deg.	Tem-perature Interval
0.00	212.0	.....	12.0	243.7	2.2
0.25	212.9	0.9	13.0	245.7	2.0
0.50	213.7	0.8	14.0	247.7	2.0
0.75	214.5	0.8	15.0	249.6	1.9
1.00	215.3	0.8	16.0	251.5	1.9
1.25	216.1	0.8	17.0	253.3	1.8
1.50	216.9	0.8	18.0	255.1	1.8
1.75	217.7	0.8	19.0	256.9	1.8
2.00	218.5	0.8	20.0	258.6	1.7
2.25	219.3	0.8	21.0	260.2	1.6
2.50	220.0	0.7	22.0	261.9	1.7
2.75	220.8	0.8	23.0	263.5	1.6
3.00	221.5	0.7	24.0	265.1	1.6
3.25	222.3	0.8	25.0	266.6	1.5
3.50	223.0	0.7	30.0	273.9	7.3
3.75	223.7	0.7	40.0	286.5	12.6
4.00	224.4	0.7	50.0	297.5	11.0
4.25	225.1	0.7	60.0	307.1	9.6
4.50	225.8	0.7	70.0	315.8	8.7
4.75	226.4	0.6	80.0	323.7	7.9
5.00	227.1	0.7	90.0	330.9	7.2
6.00	229.7	2.6	100.0	337.6	6.7
7.00	232.2	2.5	110.0	343.9	6.3
8.00	234.7	2.5	120.0	349.8	5.9
9.00	237.0	2.3	130.0	355.0	5.2
10.00	239.3	2.3	140.0	360.0	5.0
11.00	241.5	2.2	150.0	365.7	5.7

NOTE—In vacuum heating it is not considered good practice to figure beyond 15 inches of vacuum.

# Table of Altitudes and Boiling Point of Water

Locality	Elevation Above Sea Level, ft.	Boiling Point of Pure Water, deg. F.	Gauge Press. to give 212 deg. *F., lbs. and oz.	Temp. of Steam at 2 lbs. Gauge Press., deg. F.	Normal Barometric Pressure Inches of Mercury	Normal Atmos. Pressure per sq. in., lbs.
Atlanta, Ga. . . . .	1,000	210.0	9	216.9	28.88	14.18
Buffalo, N. Y. . . . .	600	210.8	5	217.5	29.33	14.40
Butte, Mont. . . . .	5,700	201.1	2 14	209.1	24.14	11.86
Carson, Nev. . . . .	4,660	203.0	2 6	210.7	25.12	12.33
Chattanooga, Tenn. . . . .	674	210.6	6	217.4	29.25	14.36
Cheyenne, Wyo. . . . .	6,000	200.5	3	208.6	23.86	11.72
Chicago, Ill. . . . .	600	210.8	5	217.5	29.33	14.40
Cincinnati, O. . . . .	500	211.0	4	217.7	29.44	14.46
Cleveland, O. . . . .	642	210.7	6	217.5	29.28	14.38
Col'do Spr'gs, Col. . . . .	5,982	200.5	3	208.6	23.88	11.73
Dallas, Tex. . . . .	425	211.1	4	217.9	29.52	14.50
Denver, Col. . . . .	5,279	201.9	2 11	209.7	24.53	12.04
Detroit, Mich. . . . .	600	210.8	5	217.5	29.33	14.40
Helena, Mont. . . . .	4,000	204.3	2 1	211.8	25.76	12.65
Knoxville, Tenn. . . . .	933	210.1	8	217.0	28.95	14.22
Leadville, Col. . . . .	10,190	192.9	4 12	201.9	20.34	9.98
Missoula, Mont. . . . .	3,200	205.8	1 10	213.1	26.55	13.03
Nashville, Tenn. . . . .	450	211.1	4	217.8	29.50	14.48
Ogden, Utah . . . . .	4,300	203.7	2 4	211.3	25.47	12.51
Pike's Peak, Col. . . . .	14,108	185.9	6 2	196.0	17.52	8.60
Provo, Utah. . . . .	4,512	203.3	2 5	211.0	25.26	12.40
Pueblo, Col. . . . .	4,660	203.0	2 6	210.7	25.12	12.33
Rochester, N. Y. . . . .	531	210.9	5	217.7	29.41	14.44
St. Cloud, Minn. . . . .	1,020	210.0	9	216.8	28.86	14.17
St. Louis, Mo. . . . .	450	211.1	4	217.8	29.50	14.48
St. Paul, Minn. . . . .	750	210.5	7	217.3	29.16	14.32
Salt Lake City, Ut. . . . .	4,300	203.7	2 4	211.3	25.47	12.51
San Antonio, Tex. . . . .	675	210.6	6	217.4	29.24	14.36
Saranac Lake, N.Y. . . . .	1,574	208.9	14	215.9	28.25	13.87
Spokane, Wash. . . . .	1,900	208.3	1	215.3	27.90	13.70

\*To give a temperature equal to 2 lbs. pressure at sea level (the basis on which Boilers are rated) add 2 lbs. to the figures given in third column.

NOTE.—The above table, by Mr. C. B. Thompson, shows the necessity of taking into account the locality of installation in estimating amount of radiation, size of boiler, etc.



# Relative Thermometer Degrees

As Defined in Webster's Dictionary

**CENTIGRADE.**—Consisting of a hundred degrees; graduated into a hundred divisions or equal parts.

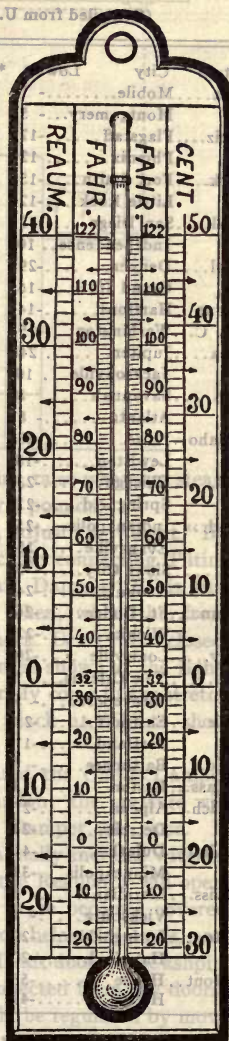
Centigrade thermometer, a thermometer having the zero, or 0, at the point indicating the freezing state of water, and the distance between that and the point indicating the boiling state of water divided into 100 degrees. It is called also the Celsius thermometer, from Anders Celsius, Swedish astronomer, the originator of this scale. Usually indicated as "C."

**FAHRENHEIT.**—Conforming to the scale used by Gabriel Daniel Fahrenheit in the graduation of his thermometer; of or relating to Fahrenheit's thermometric scale.

The Fahrenheit thermometer is so graduated that the freezing point of water is at 32 degrees above the zero of its scale, and the boiling point at 212 degrees above. It is commonly used in the United States and in England. Usually indicated by F. or Fahr.

**REAUMUR.**—Of or pertaining to René Antoine Ferchault de Reaumur; conformed to the scale adopted by Reaumur in graduating the thermometer he invented.

The Reaumur thermometer is so graduated that 0 degrees marks the freezing point and 80 degrees the boiling point of water. Frequently indicated by "R."



# Climatic Temperatures

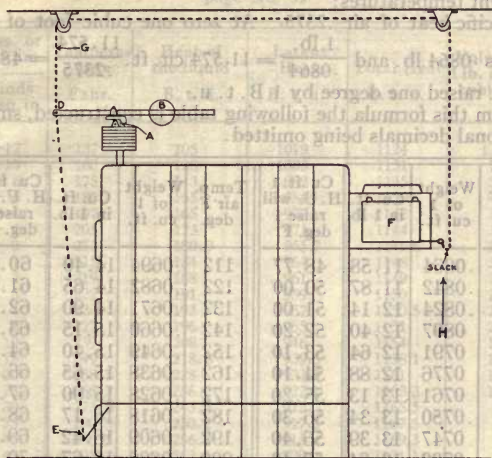
## Lowest and Average Degrees in the U. S.

(Compiled from U. S. Weather Bureau Records)

State	City	Lowest	*Av.	State	City	Lowest	*Av.
Ala....	Mobile.....	- 1	57.7	Neb....	North Platte...-	35	34.6
	Montgomery....	5	56.1		Lincoln.....-	26	35.8
Ariz....	Flagstaff.....-	17	34.8	Nev....	Carson City...-	22	....
	Phoenix.....	12	58.9		Winnemucca...-	28	37.9
Ark....	Fort Smith....-	15	49.5	N. H....	Concord.....	..	33.1
	Little Rock....-	12	52.0	N. J....	Atlantic City...-	7	41.6
Cal....	San Diego.....	32	57.2	N. Y....	Binghamton...-	26	34.1
	Independence..	10	48.7		New York City -	6	40.1
Col....	Denver.....-	29	38.4	N. M....	Roswell.....-	18	48.9
	Grand Jct.....-	16	39.2		Santa Fe.....-	13	38.0
Conn..	Hartford.....-	14	36.3	N. C....	Hatteras.....	8	53.3
D. C...	Washington...-	15	42.9		Charlotte.....-	5	49.8
Fla....	Jupiter.....	24	69.8	N. D....	Devil's Lake...-	51	18.9
	Jacksonville...-	10	60.9		Bismarck.....-	44	23.5
Ga....	Savannah.....	8	57.2	Ohio...	Toledo.....-	16	36.8
	Atlanta.....-	8	51.4		Columbus.....-	20	39.8
Idaho..	Boise.....-	28	39.6	Okla...	Oklahoma.....-	17	47.1
	Lewiston.....-	18	42.5	Ore....	Baker City....-	20	34.1
Ill....	Chicago.....-	23	35.9		Portland.....-	2	45.4
	Springfield...-	22	39.0	Pa....	Pittsburg.....-	20	40.8
Ind....	Indianapolis...-	25	40.4		Philadelphia...-	6	41.8
	Evansville.....-	15	44.1	R. I....	Providence....-	12	37.5
Ia....	Sioux City.....-	3	32.1		Block Island...-	4	39.7
	Keokuk.....-	24	37.6	S. C....	Charleston.....	7	56.9
Kan....	Ft. Dodge.....-	26	....		Columbia.....-	2	53.5
	Wichita.....-	22	42.9	S. D....	Huron.....-	43	25.9
Ky....	Louisville....-	20	45.0		Yankton.....-	32	31.2
La....	New Orleans...-	7	60.5	Tenn...	Knoxville.....-	16	47.0
	Shreveport....-	5	55.7		Memphis.....-	9	50.7
Me....	Eastport.....-	21	31.1	Tex....	Corpus Christi.	11	62.7
	Portland.....-	17	33.5		Fort Worth ...-	8	49.5
Md....	Baltimore.....-	7	43.3	Utah...	Salt Lake City -	20	39.7
Mass... Boston.....-		13	37.2	Vt....	Northfield.....-	32	27.8
Mich... Alpena.....-		27	29.1	Va....	Cape Henry...-	5	48.6
	Detroit.....-	24	35.3		Lynchburg....-	6	45.2
Minn... Duluth.....-		41	25.5	Wash...	Seattle.....	12	44.3
	Minneapolis...-	33	28.4		Spokane.....-	30	37.0
Miss... Meridian.....-		6	53.9	W. Va.	Parkersburg...-	27	41.9
	Vicksburg.....-	1	56.0		Elkins.....-	21	38.8
Mo....	Springfield...-	29	43.0	Wis...	La Crosse.....-	43	31.2
	Hannibal.....-	20	39.7		Milwaukee....-	25	32.4
Mont... Havre.....-		55	27.7	Wyo...	Cheyenne.....-	38	33.7
	Helena.....-	42	30.9		Landor.....-	36	29.0

\*October 1st to May 1st. All stated in Fahrenheit.

# Adjusting Sylphon Damper Regulator on Steam Boilers



After Boiler is set up and under fire, raise whatever steam pressure it is desired to maintain, say 2 pounds.

When the gauge shows 2 pounds, adjust the weight "B" on the Regulator lever so that the chain connecting Tilting Draft Damper "E" and Check Draft Damper "F" is just taut, both dampers being closed. Then, when the front Draft "E" is open a little and Check Draft "F" closed, there will be a little slack in the chain as shown at the right, or vice versa. The slack would naturally come in the stretch of chain along ceiling, but we show slack at "H" to show relative amount.

If any greater pressure is generated the Check Damper "F" will open and check the combustion; the pressure will lower to 2 pounds; then the Check Damper will close. If the fire is clean, the pressure will gradually increase without opening the Tilting Draft "E," and the Regulator will operate the Check Draft only until the grate becomes covered with ashes; then the pressure will drop below 2 pounds, and the Regulator will operate the Tilting Draft door on the ashpit. The chains should never be disconnected from the doors; but any adjustment of pressures should be regulated by moving the weight "B" on the lever.



# no rotating Air Heating Table 2 gnitsujBA

Cubic feet of air one B. t. u. will raise one degree Fahr. at different temperatures:

Specific heat of air .2375. At zero one cubic foot of air weighs .0864 lb. and  $\frac{1 \text{ lb.}}{.0864} = 11.574 \text{ cu. ft.}$   $\frac{11.574}{.2375} = 48.77$  cu. ft. raised one degree by 1 B. t. u.

From this formula the following table is constructed, small fractional decimals being omitted.

Temp. air F. deg.	Weight of 1 cu. ft.	Cu. ft. in 1 lb.	Cu. ft. 1 H. U. will raise 1 deg. F.	Temp. air F. deg.	Weight of 1 cu. ft.	Cu. ft. in 1 lb.	Cu. ft. 1 H. U. will raise 1 deg. F.
0	.0864	11.58	48.77	112	.0694	14.40	60.60
12	.0842	11.87	50.00	122	.0682	14.65	61.60
22	.0824	12.14	51.00	132	.0671	14.90	62.80
32	.0807	12.40	52.20	142	.0660	15.15	63.80
42	.0791	12.64	53.10	152	.0649	15.40	64.90
52	.0776	12.88	54.10	162	.0638	15.65	66.00
62	.0761	13.13	55.20	172	.0628	15.90	67.00
70	.0750	13.34	56.30	182	.0618	16.17	68.00
72	.0747	13.39	56.40	192	.0609	16.42	69.10
82	.0733	13.64	57.40	202	.0600	16.67	70.10
92	.0720	13.90	58.60	212	.0591	16.92	71.30
102	.0707	14.14	59.20				

## B. T. U. Required for Heating Air

This table specifies the quantity of heat in British thermal units required to raise one cubic foot of air through any given temperature interval.

Externl Temp.	Temperature of Air in Room									
	40°	50°	60°	70°	80°	90°	100°	110°	120°	130°
-40°	1.802	2.027	2.252	2.479	2.703	2.928	3.154	3.379	3.604	3.829
-30°	1.540	1.760	1.980	2.200	2.420	2.640	2.860	3.080	3.300	3.520
-20°	1.290	1.505	1.720	1.935	2.150	2.365	2.580	2.795	3.010	3.225
-10°	1.051	1.262	1.473	1.684	1.892	2.102	2.311	2.522	2.732	2.943
0°	0.822	1.028	1.234	1.439	1.645	1.851	2.056	2.262	2.467	2.673
10°	0.604	0.805	1.007	1.208	1.409	1.611	1.812	2.013	2.215	2.416
20°	0.393	0.590	0.787	0.984	1.181	1.378	1.575	1.771	1.968	2.165
30°	0.192	0.385	0.578	0.770	0.963	1.155	1.345	1.540	1.733	1.925
40°	0.000	0.188	0.376	0.564	0.752	0.940	1.128	1.316	1.504	1.692
50°	0.000	0.000	0.184	0.367	0.551	0.735	0.918	1.102	1.286	1.470
60°	0.000	0.000	0.000	0.179	0.359	0.538	0.718	0.897	1.077	1.256
70°	0.000	0.000	0.000	0.000	0.175	0.350	0.525	0.700	0.875	1.049

Above table from F. Schumann's Manual of Heating and Ventilation, pages 64 and 41.

# Properties of Saturated Steam

From "Notes on Heating and Ventilation" by John R. Allen,  
page No. 39

Press. or Vacuum	Temperature	Heat of the liquid	Latent Heat	Total Heat	Volume of 1 lb. of st'm cubic feet
Pounds per sq. in.	Fahr.	B. t. u.	B. t. u.	B. t. u.	
—12	137	105	1019	1124	135
—10	160	128	1003	1131	78.3
— 8	175	143	992	1135	55.9
— 6	187	155	984	1139	43.6
— 4	197	165	977	1142	35.8
— 2	205	173	971	1144	30.6
0	212	180.9	965.7	1146.6	26.36
1	215	184	964	1148	25
2	219	188	961	1149	23
3	222	191	959	1150	22.3
4	224	193	957	1150.5	21.2
5	227	196	955	1151	20.16
10	239	208	946	1154	16.3
15	249	218.8	939.3	1158.1	13.7
20	258.7	228	932.5	1161	11.85
25	266.7	236.2	927.1	1163.3	10.36
30	273.9	243.5	922	1165.5	9.34
35	280.5	250.2	917.3	1167.5	8.45
40	286.5	256.3	913	1169.3	7.73
45	292.2	262.1	909	1171.1	7.11
50	297.5	267.5	905.2	1172.7	6.61
55	302.4	272.6	901.6	1174.2	6.16
60	307.1	277.2	898.4	1175.6	5.77
65	311.5	281.8	895.1	1176.9	5.43
70	315.8	286.1	892.1	1178.2	5.13
75	319.8	290.3	889.1	1179.4	4.86
80	323.7	294.3	886.3	1180.6	4.63
85	327.4	298.1	883.6	1181.7	4.41
90	330.9	301.8	881	1182.8	4.20
95	334.4	305.4	878.5	1183.9	4.02
100	337.6	308.9	876	1184.9	3.83
110	343.9	315.4	871.4	1186.8	3.57
120	349.8	321.5	867.1	1188.6	3.33
130	355	327.5	863	1190.3	3.1
140	360	333.5	859.1	1191.9	2.92
150	365.7	338.3	855.4	1193.4	2.75

## Pressure of Water for Each Foot in Height

Feet in Height	Pounds per Square Inch	Feet in Height	Pounds per Square Inch	Feet in Height	Pounds per Square Inch
1	.43	15	6.49	50	21.65
2	.86	20	8.66	70	30.32
5	2.16	25	10.82	80	34.65
10	4.33	40	17.32	100	43.31

NOTE.—Above information is quoted from standard authorities.  
Not guaranteed.



# Heat Units and Weight of Water

Heat units in water, between 32 and 212 degree Fahrenheit and weight of water per cubic foot.

Tem. Deg. Fahr.	Heat Units	Weight, lbs. per cub. ft.	Tem. Deg. Fahr.	Heat Units	Weight, lbs. per cub. ft.	Tem. Deg. Fahr.	Heat Units	Weight, lbs. per cub. ft.
32	0.	62.42	123	91.16	61.68	168	136.44	60.81
35	3.	62.42	124	92.17	61.67	169	137.45	60.79
40	8.	62.42	125	93.17	61.65	170	138.45	60.77
45	13.	62.42	126	94.17	61.63	171	139.46	60.75
50	18.	62.41	127	95.18	61.61	172	140.47	60.73
52	20.	62.40	128	96.18	61.60	173	141.48	60.70
54	22.01	62.40	129	97.19	61.58	174	142.49	60.68
56	24.01	62.39	130	98.19	61.56	175	143.50	60.66
58	26.01	62.38	131	99.20	61.54	176	144.51	60.64
60	28.01	62.37	132	100.20	61.52	177	145.52	60.62
62	30.01	62.36	133	101.21	61.51	178	146.52	60.59
64	32.01	62.35	134	102.21	61.49	179	147.53	60.57
66	34.02	62.34	135	103.22	61.47	180	148.54	60.55
68	36.02	62.33	136	104.22	61.45	181	149.55	60.53
70	38.02	62.31	137	105.23	61.43	182	150.56	60.50
72	40.02	62.30	138	106.23	61.41	183	151.57	60.48
74	42.03	62.28	139	107.24	61.39	184	152.58	60.46
76	44.03	62.27	140	108.25	61.37	185	153.59	60.44
78	46.03	62.25	141	109.25	61.36	186	154.60	60.41
80	48.04	62.23	142	110.26	61.34	187	155.61	60.39
82	50.04	62.21	143	111.26	61.32	188	156.62	60.37
84	52.04	62.19	144	112.27	61.30	189	157.63	60.34
86	54.05	62.17	145	113.28	61.28	190	158.64	60.32
88	56.05	62.15	146	114.28	61.26	191	159.65	60.29
90	58.06	62.13	147	115.29	61.24	192	160.67	60.27
92	60.06	62.11	148	116.29	61.22	193	161.68	60.25
94	62.06	62.09	149	117.30	61.20	194	162.69	60.22
96	64.07	62.07	150	118.31	61.18	195	163.70	60.20
98	66.07	62.05	151	119.31	61.16	196	164.71	60.17
100	68.08	62.02	152	120.32	61.14	197	165.72	60.15
102	70.09	62.00	153	121.33	61.12	198	166.73	60.12
104	72.09	61.97	154	122.33	61.10	199	167.74	60.10
106	74.10	61.95	155	123.34	61.08	200	168.75	60.07
108	76.10	61.92	156	124.35	61.06	201	169.77	60.05
110	78.11	61.89	157	125.35	61.04	202	170.78	60.02
112	80.12	61.86	158	126.36	61.02	203	171.79	60.00
114	82.13	61.83	159	127.37	61.00	204	172.80	59.97
115	83.13	61.82	160	128.37	60.98	205	173.81	59.95
116	84.13	61.80	161	129.38	60.96	206	174.83	59.92
117	85.14	61.78	162	130.39	60.94	207	175.84	59.89
118	86.14	61.77	163	131.40	60.92	208	176.85	59.87
119	87.15	61.75	164	132.41	60.90	209	177.86	59.84
120	88.15	61.74	165	133.41	60.87	210	178.87	59.82
121	89.15	61.72	166	134.42	60.85	211	179.89	59.79
122	90.16	61.70	167	135.43	60.83	212	180.90	59.76

NOTE.—Above information is quoted from standard authorities Not guaranteed.

## Conditions of Water

If priming occurs in a Steam Boiler, it is often due to some natural deposit in the water. For instance, in northern Texas, the water in many parts is so charged with deposit as to produce priming and foaming at the water line that it is necessary to add 2.21 grams of oxalic acid per gallon to clarify the water. If these conditions arise in any part of the country, it is often wise to consult a chemist and secure the right treatment to free the water from the antagonistic properties.

# Velocity of Flow of Water

In Feet per Minute, Through Pipes of Various Sizes, for  
Varying Quantities of Flow

Gals. per min.	$\frac{3}{4}$ inch	1 inch	$1\frac{1}{4}$ inch	$1\frac{1}{2}$ inch	2 inch	$2\frac{1}{2}$ inch	3 inch	4 inch
5	218	122 $\frac{1}{2}$	78 $\frac{1}{2}$	54 $\frac{1}{2}$	30 $\frac{1}{2}$	19 $\frac{1}{2}$	13 $\frac{1}{2}$	7 $\frac{2}{3}$
10	436	245	157	109	61	38	27	15 $\frac{1}{3}$
15	653	367 $\frac{1}{2}$	235 $\frac{1}{2}$	163 $\frac{1}{2}$	91 $\frac{1}{2}$	58 $\frac{1}{2}$	40 $\frac{1}{2}$	23
20	872	490	314	218	122	78	54	30 $\frac{2}{3}$
25	1090	612 $\frac{1}{2}$	392 $\frac{1}{2}$	272 $\frac{1}{2}$	152 $\frac{1}{2}$	97 $\frac{1}{2}$	67 $\frac{1}{2}$	38 $\frac{1}{3}$
30	.....	735	451	327	183	117	81	46
35	.....	857 $\frac{1}{2}$	549 $\frac{1}{2}$	381 $\frac{1}{2}$	213 $\frac{1}{2}$	136 $\frac{1}{2}$	94 $\frac{1}{2}$	53 $\frac{2}{3}$
40	.....	980	628	436	244	156	108	61 $\frac{1}{3}$
45	.....	1102 $\frac{1}{2}$	706 $\frac{1}{2}$	490 $\frac{1}{2}$	274 $\frac{1}{2}$	175 $\frac{1}{2}$	121 $\frac{1}{2}$	69
50	.....	.....	785	545	305	195	135	76 $\frac{2}{3}$
75	.....	.....	1177 $\frac{1}{2}$	817 $\frac{1}{2}$	457 $\frac{1}{2}$	292 $\frac{1}{2}$	202 $\frac{1}{2}$	115
100	.....	.....	.....	1090	610	380	270	153 $\frac{1}{3}$
125	.....	.....	.....	.....	762 $\frac{1}{2}$	487 $\frac{1}{2}$	337 $\frac{1}{2}$	191 $\frac{2}{3}$
150	.....	.....	.....	.....	915	585	405	230
175	.....	.....	.....	.....	1067 $\frac{1}{2}$	682 $\frac{1}{2}$	472 $\frac{1}{2}$	268 $\frac{1}{3}$
200	.....	.....	.....	.....	1220	780	540	306 $\frac{2}{3}$

## Number of Gallons in Tanks

Length or Depth in Feet	Diameter in Inches									
	18	24	30	36	42	48	54	60	66	72
2	26	47	73	105	144	188	238	294	356	424
2 $\frac{1}{2}$	33	59	90	131	180	235	298	367	445	530
3	40	71	109	157	216	282	357	440	534	636
3 $\frac{1}{2}$	47	83	127	183	252	329	416	513	623	742
4	54	95	145	209	288	376	475	586	712	848
4 $\frac{1}{2}$	61	107	163	235	324	423	534	659	801	954
5	68	119	180	261	360	470	593	732	890	1060
5 $\frac{1}{2}$	75	131	200	287	396	517	652	805	979	1166
6	82	143	217	313	432	564	711	878	1068	1272
6 $\frac{1}{2}$	89	155	235	339	468	611	770	951	1157	1378
7	96	167	253	365	504	658	829	1024	1246	1484
7 $\frac{1}{2}$	103	179	271	391	540	705	888	1097	1335	1590
8	110	191	289	417	576	752	947	1170	1424	1696
8 $\frac{1}{2}$	...	203	307	443	612	799	1006	1243	1513	1802
10	...	239	361	521	720	940	1183	1462	1780	2120
12	...	287	433	625	864	1128	1419	1754	2136	2544
14	...	.....	.....	.....	1008	1316	1655	2046	2492	2968
16	...	.....	.....	.....	1152	1504	1891	2338	2848	3392
18	...	.....	.....	.....	.....	.....	2127	2630	3204	3816
20	...	...	.....	.....	.....	.....	2363	2922	3560	4240

NOTE—Above information is quoted from standard authorities.  
Not guaranteed.

## Specific Heat of Bodies

Material	Specific Heat	Material	Specific Heat	Material	Specific Heat
Cast Iron.....	0.12983	Gold.....	0.03244	Glass.....	0.19768
Wrought Iron.....	0.11379	Platina.....	0.03243	Burnt Clay.....	0.18500
Lime.....	0.09555	Lead.....	0.03140	Brickwood.....	0.20000
Copper.....	0.09515	Bismuth.....	0.03084	Water at 32°.....	1.00000
Brass.....	0.09391	Nickel.....	0.10860	Alcohol, (S.G. 793).....	0.62200
Silver.....	0.05701	Ice.....	0.50400	Petroleum.....	0.43400
Tin.....	0.05695	Coal.....	0.27770	Olive Oil.....	0.30960
Mercury.....	0.03332	Coke.....	0.20085	Air.....	0.23700

## Specific Gravity of Bodies

To find the weight of a body, determine its cubical contents and multiply its Specific Gravity by the weight of a like volume of water.

Body	Specific Gravity	Weight per cu. ft. in pounds
Water.....	1.00	62.5
Aluminum.....	2.50	156.3
Tin (cast).....	7.29	455.6
Steel.....	7.84	490.0
Cast Iron.....	7.21	450.6
Wrought Iron.....	7.68	480.0
Brass.....	8.38	523.8
Copper.....	8.79	549.4
Lead (cast).....	11.35	709.4
Mercury.....	13.60	850.0
Platinum.....	21.50	1343.8

## Decimal Equivalents of Fractions

Frac- tion	Dec. Equiv.	Frac- tion	Dec. Equiv.	Frac- tion	Dec. Equiv.	Frac- tion	Dec. Equiv.
1-64	0.015625	17-64	0.265625	33-64	0.515625	49-64	0.765625
1-32	0.031250	9-32	0.281250	17-32	0.531250	25-32	0.781250
3-64	0.046875	19-64	0.296875	35-64	0.546875	51-64	0.796875
1-16	0.062500	5-16	0.312500	9-16	0.562500	13-16	0.812500
5-64	0.078125	21-64	0.328125	37-64	0.578125	53-64	0.828125
3-32	0.093750	11-32	0.343750	19-32	0.593750	27-32	0.843750
7-64	0.109375	23-64	0.359375	39-64	0.609375	55-64	0.859375
1-8	0.125000	3-8	0.375000	5-8	0.625000	7-8	0.875000
9-64	0.140625	25-64	0.390625	41-64	0.640625	57-64	0.890625
5-32	0.156250	13-32	0.406250	21-32	0.656250	29-32	0.906250
11-64	0.171875	27-64	0.421875	43-64	0.671875	59-64	0.921875
3-16	0.187500	7-16	0.437500	11-16	0.687500	15-16	0.937500
13-64	0.203125	29-64	0.453125	45-64	0.703125	61-64	0.953125
7-32	0.218750	15-32	0.468750	23-32	0.718750	31-32	0.968750
15-64	0.234375	31-64	0.484375	47-64	0.734375	63-64	0.984375
1-4	0.250000	1-2	0.500000	3-4	0.750000	1-	1.000000



# Heating and Evaporative Power of Coals

One cubic foot of hard coal weighs 50 pounds approximately.  
 One cubic foot of soft coal weighs 40 pounds approximately.  
 One cubic foot of coke weighs 28 pounds approximately.

Heine's analysis shows the stated fuel values to run:—

State	Brand	B. t. u. per Lb.
Arkansas.....	Coal Hill.....	11,812
	Huntington Co.....	12,537
Illinois.....	Big Muddy.....	11,494 avg.
	Carterville.....	11,601 avg.
	Colchester.....	9,848
	Colchester Slack.....	9,035
	Dunferline Slack.....	9,401
	Duquoin.....	10,710
	Glen Carbon.....	9,740 avg.
	Girard.....	10,111 avg.
	Heitz Bluff.....	10,454 avg.
	Hurricane.....	11,868
	Muddy Valley.....	11,718
	Oakland.....	10,395
	St. Clair.....	10,068 avg.
	St. John.....	9,797 avg.
	Streator.....	11,403
	Trenton.....	10,584
	Turkey Hill.....	11,255 avg.
	Vulcan.....	9,450
Indiana.....	Block.....	10,407
Indian Territory.....	Atoka.....	11,088
	Choctaw Nation.....	12,789
	McAllister.....	13,287
Iowa.....	Milwaukee Pea.....	10,240
	What Cheer.....	8,702
Kentucky.....	Kanawha.....	13,345
Maryland.....	George's C'k Cumberland.....	13,700
Missouri.....	Bevier.....	9,890
	Elston.....	12,656
	Lump.....	9,414
New Mexico.....	Coal.....	11,756
Ohio.....	Hocking Valley.....	13,309
	Jackson Co.....	11,600
Pennsylvania.....	Clearfield.....	14,000
	Youghiogeny.....	13,480
	Pittsburg Slack.....	11,739
Tennessee.....	Glen Mary.....	13,167
	Lump.....	12,215
Texas.....	Fort Worth.....	9,450
	Fort Worth.....	11,803
Virginia.....	Pocahontas.....	13,363
Washington.....	Carbon Hill.....	12,866
West Virginia.....	New River.....	13,374
	New River.....	12,800



# Chemical Composition of Combustibles

Peclet (Authority)

	Carbon	Hydrogen	Oxygen	Nitrogen & Sulphur	Water	Ash	Total
Alcohol .....	.5198	.137	.3432	.....	.....	.....	1.000
Beeswax.....	.816	.139	.045	.....	.....	.....	1.000
Coal (Average of 97 Varieties) {	.804	.0519	.0787	.0246	.....	.0408	1.000
Coke.....	.850	.....	.....	.....	.....	.150	1.000
Oil of Turps.....	.884	.116	.....	.....	.....	.....	1.000
Olive Oil.....	.7721	.1336	.0943	.....	.....	.....	1.000
Paraffine Oil.....	.8522	.1478	.....	.....	.....	.....	1.000
Peat (Dry).....	.580	.060	.310	.....	.....	.050	1.000
Peat (Charcoal).....	.818	.....	.....	.....	.....	.182	1.000
Peat (Ordinary) .....	.464	.048	.248	.....	.200	.040	1.000
Resin .....	.7927	.1015	.1058	.....	.....	.....	1.000
Sperm Oil .....	.789	.1097	.1013	.....	.....	.....	1.000
Spermaceti .....	.816	.128	.056	.....	.....	.....	1.000
Sulphur Ether.....	.6531	.1333	.2136	.....	.....	.....	1.000
Tallow.....	.790	.117	.093	.....	.....	.....	1.000
Wood (Dry).....	.510	.053	.417	.....	.....	.020	1.000
Wood (Ordinary).....	.408	.042	.334	.....	.200	.016	1.000
Wood (Charcoal).....	.930	.....	.....	.....	.....	.070	1.000

## Total Heat Evolved by Combustibles

And their equivalent Evaporative Power with the weight of Oxygen and quantity of Air Chemically consumed

Combustibles	Weight of Oxygen per lb. of Combustibles	Quantity of Air per lb. of Combustibles		Total Heat per lb. Combustibles	Equivalent Evaporative Power 1 lb. Combustible (Atmospheric Pressure)
			AIR Cubic Ft at 60 deg.		
1 Lb. Weight	Lb.	Lb.	B. t. u.		Lbs. of Water from and at 212 degrees
Hydrogen .....	8.00	34.80	457	62032	64.20
C to CO.....	1.33	5.80	76	4452	4.61
C to CO <sup>2</sup> .....	2.66	11.60	152	14500	15.00
CO to CO <sup>2</sup> .....	0.57	2.48	33	4325	4.48
CH <sup>4</sup> (Coal Gas)....	4.00	17.40	229	23513	24.34
C <sup>2</sup> H <sup>2</sup> (Olefiant)...	3.43	15.00	196	21343	22.09
Sulphur.....	1.00	4.35	57	4032	4.17
Average Coal.....	2.46	10.70	140	14133	14.62
Coke (desiccated)...	2.50	10.90	143	13550	14.02
Wood.....	1.40	6.10	80	7792	8.07
Peat.....	1.75	7.60	100	9951	10.30
Lignite .....	2.03	8.85	116	11678	12.10
Asphalt .....	2.73	11.87	156	16655	17.24
Straw (15% H <sup>2</sup> -O)..	0.98	4.26	56	5196	5.56
Petroleum .....	4.12	17.93	235	27531	28.50

NOTE.—Above information is quoted from standard authorities. Not guaranteed.

## Table of Mains and Branches

Main	Branch
1 in. will supply 2	3/4 in.
1 1/4-in. " 2	1 in.
1 1/2-in. " 2	1 1/4 in.
2 -in. " 2	1 1/2 in.
2 1/2-in. " 2 1 1/2-in. and 1 1 1/4-in., or 1 2 -in. and 1 1 1/4-in.	
3 -in. " 1 2 1/2-in. and 1 2 -in., or 2 2 -in. and 1 1 1/2-in.	
3 1/2-in. " 2 2 1/2-in. or 1 3 -in., and 1 2 -in. or 3 2 -in.	
4 -in. " 1 3 1/2-in. and 1 2 1/2-in., or 2 3 -in. and 4 2 -in.	
4 1/2-in. " 1 3 1/2-in. and 1 3 -in., or 1 4 -in. and 1 2 1/2-in.	
5 -in. " 1 4 -in. and 1 3 -in., or 1 4 1/2-in. and 1 2 1/2-in.	
6 -in. " 2 4 -in. and 1 3 -in., or 4 3 -in. or 10 2 -in.	
7 -in. " 1 6 -in. and 1 4 -in., or 3 4 -in. and 1 2 -in.	
8 -in. " 2 6 -in. and 1 5 -in., or 5 4 -in. and 2 2 -in.	

## Weights

1 cubic inch of Cast Iron.....	weighs.....	0.260 pounds
1 cubic inch of Wrought Iron.....	weighs.....	0.280 pounds
1 cubic inch of Water.....	weighs.....	0.036 pounds
1 U. S. Gallon.....	weighs.....	8.330 pounds
1 Imperial Gallon.....	weighs.....	10.000 pounds
1 U. S. Gallon.....	equals.....	231.000 cubic inches
1 Imperial Gallon.....	equals.....	277.274 cubic inches
1 cubic foot of Water.....	equals.....	7.480 U. S. gallons
1 pound of Steam.....	equals.....	27.222 cubic feet
1 pound of Air.....	equals.....	13.817 cubic feet

## Measure of Surface Measure of Solidity

144 sq. inches = 1 sq. foot	1728 cu. inches = 1 cu. foot
9 sq. feet = 1 sq. yard	27 cu. feet = 1 cu. yard
30 1/4 sq. yards = 1 sq. rod	
40 sq. rods = 1 rood	
4 roods = 1 acre	
10 sq. chains = 1 acre	
640 acres = 1 sq. mile	

## Liquid Measure

4 gills	make 1 pint
2 pints	make 1 quart
4 quarts	make 1 gallon
31 1/2 gallons	make 1 barrel

## Boiling Points of Various Fluids

Degrees	Degrees
Water in Vacuum..... 98	Refined Petroleum..... 316
Water, Atmosph'c Pres. 212	Turpentine..... 315
Alcohol..... 173	Sulphur..... 570
Sulphuric Acid..... 240	Linseed Oil..... 597

## Melting Points of Different Metals

Degrees	Degrees
Aluminum..... 1400	Iron (cast)..... 2450
Antimony..... 810	Iron (wrought)..... 2912
Bismuth..... 476	Lead..... 608
Brass..... 1900	Platinum..... 3080
Bronze..... 1692	Silver (pure)..... 1873
Copper..... 1996	Steel..... 2500
Glass..... 2377	Tin..... 446
Gold (pure)..... 2590	Zinc..... 680

NOTE.—Above information is quoted from standard authorities  
Not guaranteed.

# Surface of Wrought Iron Pipe

Inside diameter Inches	1	1¼	1½	2	2½	3	3½	4	5	6
Length of Pipe per square foot of external surface	2.9	2.3	2.0	1.6	1.32	1.09	0.95	0.84	0.68	0.57
Square feet surface per one lineal foot	0.34	0.43	0.50	0.62	0.75	0.92	1.05	1.18	1.46	1.74

## Dimensions of Standard Wrought Iron Pipe

We do not handle or quote prices on Pipe

Nomi- nal Inside Diam. Inches	Actual Diam. Inches		Thick- ness Inches	Circumference Inches		Area Square Inches	
	Inside	Outside		Inter- nal	Exter- nal	Internal	External
⅛	.27	.4	.07	.84	1.27	.06	.12
¼	.36	.54	.08	1.14	1.69	.1	.22
⅜	.49	.67	.09	1.55	2.12	.19	.35
½	.62	.84	.10	1.95	2.65	.3	.55
¾	.82	1.05	.11	2.58	3.29	.53	.86
1	1.04	1.31	.13	3.29	4.13	.86	1.35
1¼	1.38	1.66	.14	4.33	5.21	1.49	2.16
1½	1.61	1.9	.14	5.06	5.96	2.03	3.83
2	2.06	2.37	.15	6.49	7.46	3.35	4.43
2½	2.46	2.87	.20	7.75	9.03	4.78	6.49
3	3.06	3.5	.21	9.63	10.96	7.38	9.62
3½	3.56	4.	.22	11.14	12.56	9.83	12.56
4	4.02	4.5	.23	12.64	14.13	12.73	15.9
4½	4.5	5.	.24	14.15	15.7	15.93	19.63
5	5.04	5.56	.25	15.84	17.47	19.99	24.29
6	6.06	6.62	.28	19.05	20.81	28.88	34.47
7	7.02	7.62	.30	22.06	23.95	38.73	45.66
8	7.98	8.62	.32	25.07	27.09	50.03	58.42
9	9.	9.68	.34	28.27	30.43	63.63	73.71
10	10.01	10.75	.36	31.47	33.77	78.83	90.79
11	11.	11.75	.37	34.55	36.91	95.03	108.43
12	12.	12.75	.37	37.7	40.05	113.09	127.67

## Capacities and Threads of Standard W. I. Pipe

Nomi- nal Inside Diam. Inches	Length to Thread Inches	Length of Pipe Con- taining one gal. Feet	Con- tained Pounds of Water per Lineal Foot	Nomi- nal Inside Diam. Inches	Length to Thread Inches	Length of Pipe Con- taining one gal. Feet	Con- tained Pounds of Water per Lineal Foot
⅛	¾	336.6	.024	3½	1½	1.95	4.285
¼	¾	148.8	.044	4	1½	1.51	5.517
⅜	1½	100.8	.082	4½	1½	1.2	6.908
½	1½	63.2	.132	5	1¼	.96	8.668
¾	1½	36.1	.23	6	1¾	.66	12.521
1	1½	22.3	.373	7	1½	.49	16.79
1¼	1½	12.8	.648	8	1¾	.38	21.688
1½	1½	9.4	.883	9	1¾	.3	27.58
2	1½	5.7	1.454	10	1¾	.24	34.171
2½	1	4.02	2.072	11		.2	41.189
3	1	2.6	3.202	12		.17	49.017

NOTE.—Above information is quoted from standard authorities.  
Not guaranteed.



# Square Feet of Radiating Surface of Pipe per Lineal Foot

On all lengths over one foot, fractions less than tenths are added to or dropped.

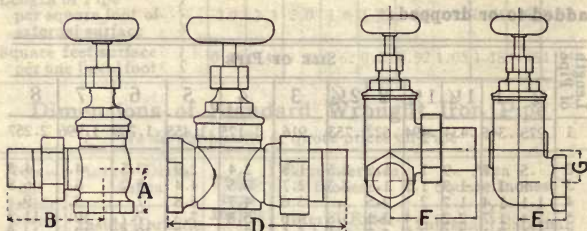
Length of Pipe	SIZE OF PIPE											
	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	4	5	6	7	8
1	.275	.346	.434	.494	.622	.753	.916	1.175	1.455	1.739	1.996	2.257
2	.5	.7	.9	1.	1.2	1.5	1.8	2.4	2.9	3.5	4.	4.5
3	.8	1.	1.3	1.5	1.9	2.3	2.7	3.5	4.4	5.2	6.	6.8
4	1.1	1.4	1.7	2.	2.5	3.	3.6	4.7	5.8	7.	8.	9.
5	1.4	1.7	2.2	2.4	3.1	3.8	4.6	5.8	7.3	7.7	10.	11.3
6	1.6	2.1	2.6	2.9	3.7	4.5	5.5	7.	8.7	10.5	12.	13.5
7	1.9	2.4	3.	3.4	4.4	5.3	6.4	8.2	10.2	12.1	14.	15.8
8	2.2	2.8	3.5	3.9	5.	6.	7.3	9.4	11.6	13.9	16.	18.
9	2.5	3.1	3.9	4.4	5.6	6.8	8.2	10.6	13.1	15.7	18.	20.3
10	2.7	3.5	4.3	4.9	6.2	7.5	9.1	11.8	14.6	17.4	20.	22.6
11	3.	3.8	4.8	5.4	6.8	8.3	10.	12.9	16.	19.1	22.	24.9
12	3.3	4.1	5.2	5.9	7.5	9.	11.	14.1	17.4	20.9	24.	27.1
13	3.6	4.5	5.6	6.4	8.1	9.8	11.9	15.3	18.9	22.6	26.	29.4
14	3.8	4.8	6.1	6.9	8.7	10.5	12.8	16.5	20.3	24.3	28.	31.6
15	4.1	5.2	6.5	7.4	9.3	11.3	13.7	17.6	21.8	26.1	30.	33.9
16	4.4	5.5	6.9	7.9	10.	12.	14.6	18.8	23.2	27.8	32.	36.1
17	4.7	5.9	7.4	8.4	10.6	12.8	15.5	20.	24.7	29.5	34.	38.4
18	5.	6.2	7.8	8.9	11.2	13.5	16.5	21.2	26.2	31.3	36.	40.6
19	5.2	6.6	8.3	9.4	11.8	14.3	17.4	22.3	27.6	33.1	38.	42.9
20	5.5	6.9	8.7	9.9	12.5	15.	18.3	23.5	29.1	34.8	40.	45.2
21	5.8	7.3	9.1	10.4	13.	15.8	19.2	24.7	30.5	36.5	42.	47.4
22	6.	7.6	9.6	10.9	13.7	16.5	20.2	25.9	32.	38.3	44.	49.7
23	6.3	8.	10.	11.3	14.3	17.3	21.1	27.	33.5	40.	46.	52.
24	6.6	8.3	10.4	11.9	14.9	18.	22.	28.2	34.9	41.7	48.	54.2
25	6.9	8.6	10.9	12.3	15.6	18.8	22.9	29.3	36.3	43.5	50.	56.4
26	7.1	9.	11.3	12.8	16.2	19.5	23.8	30.5	37.8	45.2	52.	58.6
27	7.4	9.4	11.7	13.3	16.8	20.3	24.7	31.7	39.3	47.	54.	61.
28	7.7	9.7	12.2	13.8	17.4	21.	25.6	32.9	40.7	48.7	56.	63.2
29	8.	10.	12.6	14.3	18.	21.8	26.6	34.1	42.2	50.4	58.	65.5
30	8.3	10.4	13.	14.8	18.7	22.5	27.5	35.3	43.6	52.1	60.	67.7
31	8.5	10.7	13.5	15.3	19.3	23.3	28.4	36.4	45.1	53.9	62.	70.
32	8.8	11.1	13.9	15.8	19.9	24.1	29.3	37.6	46.5	55.6	64.	72.2
33	9.1	11.4	14.3	16.3	20.5	24.8	30.2	38.8	48.	57.4	66.	74.4
34	9.4	11.7	14.7	16.8	21.2	25.6	31.1	40.	49.5	59.1	68.	76.7
35	9.6	12.1	15.2	17.3	21.8	26.3	32.	41.1	50.9	60.8	70.	79.
36	9.9	12.5	15.6	17.8	22.4	27.	33.	42.3	52.4	62.6	72.	81.3
37	10.2	12.8	16.1	18.3	23.	27.8	33.9	43.5	53.8	64.3	74.	83.5
38	10.5	13.2	16.5	18.8	23.7	28.5	34.8	44.6	55.2	66.	76.	85.8
39	10.7	13.5	16.9	19.3	24.3	29.3	35.7	45.8	56.7	67.8	78.	88.
40	11.	13.8	17.4	19.8	24.9	30.1	36.6	47.	58.2	69.5	80.	90.2
41	11.3	14.2	17.8	20.3	25.5	30.8	37.6	48.2	59.6	71.3	82.	92.5
42	11.5	14.5	18.2	20.8	26.1	31.6	38.5	49.4	61.1	73.	84.	94.8
43	11.8	14.9	18.7	21.3	26.8	32.3	39.4	50.6	62.5	74.8	86.	97.
44	12.1	15.2	19.1	21.8	27.4	33.1	40.3	51.7	64.	76.5	88.	99.3
45	12.4	15.6	19.5	22.2	28.	33.8	41.2	52.9	65.5	78.2	90.	101.6
46	12.7	15.9	20.	22.7	28.6	34.6	42.2	54.	67.	80.	92.	103.8
47	12.9	16.3	20.4	23.2	29.2	35.3	43.	55.2	68.4	81.7	94.	106.
48	13.2	16.6	20.8	23.7	29.9	36.1	43.9	56.4	69.8	83.5	96.	108.4
49	13.5	17.	21.3	24.2	30.5	36.8	44.8	57.6	71.2	85.1	98.	110.5
50	13.8	17.3	21.7	24.7	31.1	37.6	45.8	58.7	72.7	87.	100.	112.8

NOTE.—Above information is quoted from standard authorities. Not guaranteed.



# Measurements of Valves and Elbows

For Roughing-In Work



Size, inches.....		$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
Nos. 70 to 74 Valves.....	A	$1\frac{1}{4}$	$1\frac{7}{8}$	$1\frac{9}{8}$	$1\frac{13}{8}$	2	$2\frac{1}{8}$
	B	$2\frac{1}{2}$	$2\frac{1}{8}$	$3\frac{1}{4}$	$3\frac{1}{2}$	$3\frac{1}{8}$	$4\frac{3}{8}$
Nos. 99 to 103 ".....	A	....	$1\frac{3}{8}$	$1\frac{1}{2}$	$1\frac{13}{8}$	$2\frac{1}{8}$	$2\frac{1}{2}$
	B	....	$2\frac{3}{4}$	3	$3\frac{1}{2}$	$3\frac{1}{8}$	$4\frac{1}{2}$
Nos. 140 to 144 ".....	A	$1\frac{1}{4}$	$1\frac{3}{8}$	$1\frac{5}{8}$	$1\frac{7}{8}$	$2\frac{7}{32}$	$2\frac{13}{32}$
	B	$2\frac{1}{2}$	$2\frac{1}{8}$	$3\frac{1}{8}$	$3\frac{1}{2}$	$3\frac{1}{8}$	$4\frac{1}{2}$
Nos. 114 to 118 ".....	D	....	$4\frac{1}{4}$	$4\frac{3}{4}$	$5\frac{1}{8}$	$6\frac{1}{8}$	$7\frac{1}{4}$
No. 301.....	A	$1\frac{1}{4}$	$1\frac{11}{32}$	$1\frac{13}{32}$	$1\frac{7}{8}$	$2\frac{1}{8}$	$2\frac{1}{2}$
	B	$2\frac{1}{8}$	$2\frac{1}{8}$	$3\frac{1}{8}$	$3\frac{5}{8}$	$3\frac{3}{8}$	$4\frac{5}{8}$
Nos. 130 to 134 Union Elbows...	A	$1\frac{3}{8}$	$1\frac{3}{8}$	$1\frac{1}{2}$	$1\frac{5}{8}$	$2\frac{5}{8}$	$2\frac{5}{8}$
	B	$2\frac{3}{8}$	$2\frac{9}{8}$	$3\frac{1}{8}$	$3\frac{3}{8}$	$3\frac{1}{2}$	$4\frac{3}{8}$
No. 304.....	D	$2\frac{1}{8}$	$2\frac{1}{4}$	$2\frac{1}{8}$	$2\frac{7}{8}$	$3\frac{1}{4}$	$3\frac{3}{4}$
No. 305.....	D	$3\frac{5}{8}$	$3\frac{5}{8}$	$4\frac{3}{8}$	$4\frac{1}{2}$	5	$5\frac{1}{8}$
No. 335 Gate Valve.....	D	$2\frac{1}{8}$	$2\frac{1}{4}$	$2\frac{1}{8}$	$2\frac{7}{8}$	$3\frac{1}{4}$	$3\frac{3}{4}$
No. 373 ".....	D	$3\frac{5}{8}$	$3\frac{5}{8}$	$4\frac{3}{8}$	$4\frac{1}{2}$	5	$5\frac{1}{8}$
No. 345 Valve.....	A	....	$1\frac{3}{8}$	$1\frac{7}{8}$	$1\frac{7}{8}$	$2\frac{1}{8}$	$2\frac{1}{2}$
	B	....	$3\frac{1}{4}$	$3\frac{3}{8}$	$3\frac{1}{2}$	$3\frac{1}{8}$	$4\frac{1}{8}$
Nos. 32-34, 302, 303 Cor. Valves..	E	$1\frac{3}{8}$	$1\frac{7}{8}$	$1\frac{7}{8}$	$1\frac{13}{8}$	$2\frac{1}{8}$	$2\frac{1}{2}$
	F	$2\frac{1}{4}$	$2\frac{5}{8}$	$3\frac{1}{8}$	$3\frac{1}{2}$	$3\frac{1}{8}$	$4\frac{1}{8}$
	G	$2\frac{3}{32}$	$1\frac{3}{32}$	$1\frac{1}{8}$	$1\frac{1}{2}$	$1\frac{1}{2}$	2
No. 346 Corner Valve.....	E	....	$1\frac{7}{8}$	$1\frac{7}{8}$	2	$2\frac{1}{4}$	$2\frac{1}{2}$
	F	....	$3\frac{3}{8}$	$3\frac{1}{4}$	$3\frac{3}{4}$	4"	$4\frac{5}{8}$
	G	....	$\frac{7}{8}$	$1\frac{1}{8}$	$1\frac{3}{8}$	$1\frac{5}{8}$	$1\frac{1}{2}$

## Expansion of Wrought-Iron Pipe

Under Temperatures from 215° to 338°

Temperature of the air when Pipe is Fitted	Length of Pipe when Fitted	Length of Pipe when Heated to							
		215°		265°		297°		338°	
		Ft.	In	Ft.	In.	Ft.	In.	Ft.	In.
Zero	100 feet	100	1.72	100	2.12	100	2.31	100	2.70
32°	100 "	100	1.47	100	1.78	100	2.12	100	2.45
64°	100 "	100	1.21	100	1.61	100	1.87	100	2.19

## Telegraph Code

In writing a cipher message, please observe the following:

First—Begin every cipher word with a capital letter.

Second—Whenever a blank occurs in a sentence, the word or words supplying such blank must immediately follow the cipher word of the sentence.

### Quotations and Correspondence

	Cipher Word
At what price and how soon can you furnish...	Quadrants
Quote best price on.....	Quadrate
In market for.....	Quadrangle
Quote best price on....square feet of standard (38-inch) height of....	Radiators.....
Wire reply quickly .....	Quadrille
Will wire you to-morrow morning.....	Quadroon
Have written.....	Quaffed
Must have information immediately.....	Quaggy
Answer by first mail.....	Quahog
See our letter of, ...giving full particulars.....	Quagmire
Have received no reply from you to our letter of.....	Quaintly
Referring to your telegram of.....	Quakingly
Referring to your letter of.....	Quakerism
Have received no reply to our telegram of.....	Qualify
Referring to our telegram of.....	Quamodit
Referring to our letter of.....	Quandary
Referring to telephone conversation of to-day..	Quarried
Do not understand the meaning of.....	Queerness
Inclosure mentioned in your letter of....not received, mail same at once.....	Quartette
We quote you for immediate acceptance.....	Quantum
F. O. B. factory less the actual rate of freight in carloads or less to any railroad point of destination not to exceed 30c per 100 lbs....	Quash
Wire at once less than carload freight rate on...	F. O. B. factory less the actual rate of freight in carloads or less to any railroad point of destination not to exceed 30c per 100 lbs....
Answering your wire of date less than carload rate per cwt. on .....	Quaternion
Wire carload freight rate on.....	Quaternary
Answering your wire of date the carload rate per cwt. and minimum weight on.....	Quaternate
Change my route to read as follows.....	Quartzite
Will be here until.....	Quaternity
Will be in.....	Questor
Immediate specifications, three months delivery limit.....	Quebracho
Factory shipment with regular freight allowance.	Quebrith
2½ per cent.....	Quirister
5 per cent.....	Quirites
7½ per cent.....	Quitrent
10 per cent.....	Quitclaim
	Quittance

# Telegraph Code—Continued

## Orders and Shipments

	Cipher Word
Ship immediately.	Obdurate
Ship by express.	Obedient
Ship by express, prepaid.	Oxalic
Ship by freight.	Obeisance
Ship by best route.	Obelisk
Ship by boat.	Obesity
Ship immediately our order No.—	Objective
Ship with draft and bill of lading attached.	Oblate
Ship in first car to.	Obliging
Amended shipping instructions.	Obligor
Send us bill of lading covering our order (No.—)	Obliquity
Enter order as per our inquiry of.	Oblivion
Enter order at your quotation of.	Obscurity
Include in car now assembling at. . . . . plant.	Obsequious
Ship by same route as our order (No. or date).	Observant
Correction notices.	Obscurant
Will send shipping instructions by mail.	Observer
Shipping instructions for order (No. or date) are.	Obstacle
Ship what you can at once.	Obstinacy
Can't ship as ordered, but could ship to-day.	Obstruent
Do not hold for other orders, but rush quickly.	Obtruder
Send as small lot, unless car going at once.	Obtrusive
When can you make shipment?	Obviously
Can you ship immediately?	Obvolute
When will order (No. or date) be shipped.	Opaque
When and by what route did you ship our order	Operas
Trace at once and advise date of delivery to consignee of material covered by our orders.	Operculum
Add to our order (No. or date).	Opiate
Duplicate our order (No. or date).	Opium
You may substitute on our order (No. or date).	Opossum
Omit. . . . . from our order (No. or date).	Opposer
Hold for instruction order (No. or date).	Oppressor
Could ship immediately.	Optative
Expect to make shipment.	Optical
Your order (No. or date) was shipped.	Optician
If not in stock wire.	Optimates
Order No. . . . . is ready for shipment. We have no car going for. . . . . days. Shall we forward as small lot? If so wire shipping instructions.	Ophthalmomy
Order No. . . . . has not yet been shipped.	Ophidia
Order No. . . . . has been preferred for shipment.	Oquassa
See amended shipping instructions.	Orisont
Referring to your amended shipping instructions	Orillon
Extend preference and advise by return mail best possible shipping date order No. . . . .	Orismology



# Telegraph Code—Continued

## Orders and Shipments—Continued

	Cipher Word
Can ship complete your No..... immediately	
except.... Shall we make such shipment?..	Orpiment
Make proposed shipment order No..... without	
waiting for.....	Orrisroot
Wire at once routing our material covered by..	Orsellenic
Answering your wire, route material covered by.	Ortalidian
When will you ship car containing our order?..	Ortolan
See our correction notice.....	Ortygan
Referring to your correction notice.....	Orvietan
Your order (No. or date) does not specify.....	Opulent
Change our order (No. or date) to read.....	Oracular
Referring to your order (No. or date).....	Orators
Referring to our order (No. or date).....	Orchards
Do not find any order from you (No. or date)..	Orchestra

## Table of Dates

In telegraphing dates, prefix the day of the month. For Example: "Avonburg" would mean "first day of January."

Date	Cipher Word	Date	Cipher Word
1st.....	Avon	17th.....	Edge
2nd.....	Arch	18th.....	Ellis
3d.....	Aden	19th.....	Farn
4th.....	Bath	20th.....	Glen
5th.....	Belle	21st.....	Grace
6th.....	Blake	22d.....	Horn
7th.....	Brook	23d.....	Lees
8th.....	Birch	24th.....	Linn
9th.....	Clair	25th.....	Orr
10th.....	Clyde	26th.....	Oster
11th.....	Cedar	27th.....	Pine
12th.....	Cole	28th.....	Plain
13th.....	Deer	29th.....	Queen
14th.....	Devon	30th.....	Ross
15th.....	Dyke	31st.....	Swan
16th.....	Earl		

NOTE.—Adding "morn" or "aft" to any of above code words will signify morning or afternoon of any of the dates given. Thus: "Birchmorn" will be understood as "the morning of the 8th;" "Orraft" will signify "the afternoon of the 25th," and so on.

Month	Cipher Word	Month	Cipher Word
January.....	Burg	July.....	Ham
February.....	Boro	August.....	Mont
March.....	Hill	September.....	Moor
April.....	Dale	October.....	Ton
May.....	Field	November.....	Ville
June.....	Ford	December.....	Wood



# Telegraph Code—Continued

Time		Cipher Word	Cipher Word
1 day.....	Apple	2 weeks.....	Lemon
2 days.....	Apricot	3 weeks.....	Olives
3 days.....	Banana	1 month.....	Orange
4 days.....	Cherry	2 months.....	Peach
5 days.....	Citron	3 months.....	Pears
6 days.....	Dates	4 months.....	Plum
10 days.....	Figs	5 months.....	Quince
1 week.....	Grape	6 months.....	Tomatoes

## Transportation Lines

We here present the names of the principal trunk and connecting transportation lines which are used in telegraphic correspondence in regard to shipments from our Plants and Branches.

	Cipher Word
Alabama & Vicksburg Ry. ....	Rabbit
Alabama Great Southern R. R. ....	Rabble
American Hawaiian Steamship Co. ....	Raccoon
Anchor Line. ....	Racemic
Ann Arbor R. R. ....	Racemose
Atchison, Topeka & Santa Fe Ry. ....	Racer
Atlanta, Birmingham & Atlantic R. R. ....	Rachitis
Atlantic Coast Line R. R. ....	Racial
Baltimore & Ohio R. R. ....	Racing
Baltimore Ohio Southwestern R. R. ....	Rack
Boston & Albany R. R. ....	Racket
Boston & Maine R. R. ....	Racking
Buffalo & Susquehanna Ry. ....	Racy
Buffalo, Rochester & Pittsburgh Ry. ....	Radial
Canadian Northern Ry. ....	Radical
Canadian Pacific Ry. ....	Radix
Central New England Ry. ....	Raffia
Central of Georgia Ry. ....	Raffle
Central R. R. of New Jersey. ....	Raft
Central Vermont Ry. ....	Rafter
Chesapeake & Ohio Ry. ....	Rafting
Chicago & Alton R. R. ....	Rage
Chicago & Eastern Illinois R. R. ....	Ragged
Chicago & North-Western Ry. ....	Raging
Chicago, Burlington & Quincy R. R. ....	Raglan
Chicago, Cincinnati & Louisville R. R. ....	Ragman
Chicago Great Western R. R. ....	Ragout
Chicago, Indiana & Southern R. R. ....	Ragweed
Chicago, Indianapolis & Louisville Ry. ....	Ragwort
Chicago, Milwaukee & Gary Ry. ....	Raid
Chicago, Milwaukee & Puget Sound Ry. ....	Raider
Chicago, Milwaukee & St. Paul Ry. ....	Railer
Chicago, Rock Island & Pacific Ry. ....	Railings

# Telegraph Code—Continued

## Transportation Lines—Continued

Chicago, St. Paul, Minneapolis & Omaha Ry.	Rainbow
Cincinnati, Hamilton & Dayton Ry.	Raindrop
Cincinnati, New Orleans & Texas Pacific Ry.	Rainfall
Cleveland, Cincinnati, Chicago & St. Louis Ry.	Raising
Colorado & Southern Ry.	Ramble
Colorado Midland Ry.	Ramiform
Delaware & Hudson Co.	Rampage
Delaware, Lackawanna & Western R. R.	Rampant
Denver & Rio Grande R. R.	Rampart
Detroit & Toledo Shore Line R. R.	Ramrod
Detroit Toledo & Ironton Ry.	Ramshackle
Duluth, Missabe & Northern Ry.	Ramulose
Duluth, Rainy Lake & Winnipeg Ry.	Ranchero
Duluth, South Shore & Atlantic Ry.	Ranchman
Dunkirk, Allegheny Valley & Pittsburgh R. R.	Rancid
Elgin, Joliet & Eastern Ry.	Rancor
El Paso & Southwestern R. R.	Random
Erie R. R.	Rankness
Evansville & Terra Haute R. R.	Ransack
Ft. Worth & Denver City Ry.	Rapacious
Galveston, Harrisburg & San Antonio Ry.	Rapacity
Grand Rapids & Indiana Ry.	Rapidity
Grand Trunk Ry.	Rapier
Great Northern Ry.	Rapture
Green Bay & Western R. R.	Rapturous
Gulf, Colorado & Santa Fe Ry.	Rarebit
Hocking Valley Ry.	Rarefy
Illinois Central R. R.	Rareness
Iowa Central Ry.	Rascaldom
Kansas City, Clinton & Springfield Ry.	Rashness
Kansas City, Mexico & Orient Ry.	Ratable
Kansas City Southern Ry.	Rataplan
Kewaunee, Green Bay & Western R. R.	Rachet
Lake Erie & Western R. R.	Rational
Lake Shore & Michigan Southern Ry.	Rattan
Lehigh Valley R. R.	Rattlebox
Long Island R. R.	Rattletrap
Louisville & Nashville R. R.	Raucous
Maine Central R. R.	Ravager
Mallory Steamship Co.	Ravehook
Michigan Central R. R.	Ravelin
Minneapolis & St. Louis R. R.	Ravenous
Minneapolis, St. Paul & Sault Ste Marie Ry.	Ravine
Missouri, Kansas & Texas Ry.	Rawhide
Missouri Pacific Ry.	Rickety
Mobile & Ohio R. R.	Rickrack
Morgan Line	Ricochet

# Telegraph Code—Continued

## Transportation Lines—Continued

	Cipher Word
Morgan's Louisiana & Texas R. R. ....	Ridable
Mutual Transit Co. ....	Riddance
Nashville, Chattanooga & St. Louis Ry. ....	Riderless
New Orleans & Northeastern R. R. ....	Ridgepole
New York Central & Hudson River R. R. ....	Ridicule
New York, Chicago & St. Louis R. R. ....	Riffraff
New York, New Haven & Hartford R. R. ....	Rigadoon
Norfolk & Western Ry. ....	Rigging
Northern Pacific Ry. ....	Righteous
Oregon Railroad & Navigation Co. ....	Rightful
Oregon Short Line R. R. ....	Rigidity
Oregon & Washington R. R. ....	Riglet
Pennsylvania Co. ....	Rigmarole
Pennsylvania R. R. ....	Ringleader
Pere Marquette R. R. ....	Ringlet
Philadelphia & Reading Ry. ....	Rockery
Pittsburgh, Cincinnati, Chicago & St. Louis Ry. ....	Roguish
Quincy, Omaha & Kansas City R. R. ....	Roister
Richmond, Fredericksburg & Potomac R. R. ....	Romance
Rutland R. R. ....	Romantic
St. Joseph & Grand Island Ry. ....	Romping
St. Louis & San Francisco R. R. ....	Rompish
St. Louis, Iron Mountain & Southern Ry. ....	Rondeau
St. Louis, Kansas City & Colorado R. R. ....	Roofing
St. Louis Southwestern Ry. ....	Roofless
San Pedro, Los Angeles & Salt Lake R. R. ....	Roost
Seaboard Air Line. ....	Rooter
Southern Ry. ....	Rope
Southern Pacific Co. ....	Ropeband
Texas & New Orleans R. R. ....	Ropedancer
Texas & Pacific Ry. ....	Rosary
Texas City Steamship Co. ....	Roseate
Toledo, Peoria & Western Ry. ....	Rosebush
Toledo, St. Louis & Western R. R. ....	Rosemary
Toronto, Hamilton & Buffalo Ry. ....	Rosette
Trinity & Brazos Valley Ry. ....	Rosewater
Union Pacific Ry. ....	Rosewood
Union Steamboat Line. ....	Rosin
Vandalia R. R. ....	Rosiness
Vicksburg, Shreveport & Pacific Ry. ....	Roster
Wabash R. R. ....	Rostrum
Western Pacific Ry. ....	Rotary
Western Transit Co. ....	Rotate
West Shore R. R. ....	Rotation

## Express Companies

	Cipher Word
Adams. ....	Ringmaster
American. ....	Ringneck



# Telegraph Code—Continued

## Express Companies—Continued

### Cipher Word

Canadian.....	Ringtoss
Canadian Northern.....	Ringworm
Dominion.....	Riotous
Globe.....	Riparian
Great Northern.....	Ritualism
Long Island.....	Rivalry
National.....	Riveting
New York and Boston Despatch.....	Rivulet
Northern.....	Roadstead
Pacific.....	Roadster
Southern.....	Roasting
United States.....	Robinet
Wells Fargo.....	Rockaway
Western.....	Rockfish

## Inches

Inches	Cipher Word	Inches	Cipher Word
$\frac{1}{8}$ .....	Inarching	3.....	Irradiate
$\frac{1}{4}$ .....	Inactive	$3\frac{1}{2}$ .....	Irrigate
$\frac{3}{8}$ .....	Inability	4.....	Irruption
$\frac{1}{2}$ .....	Inaction	$4\frac{1}{2}$ .....	Irritant
$\frac{3}{4}$ .....	Inanity	5.....	Islands
1.....	Inaudible	$5\frac{1}{2}$ .....	Isomeric
$1\frac{1}{4}$ .....	Inbreeds	6.....	Isolated
$1\frac{1}{2}$ .....	Incarnate	7.....	Isthmus
2.....	Irksome	8.....	Itinerant
$2\frac{1}{2}$ .....	Ironical		

## Quantity

	Cipher Word		Cipher Word
200 sq. ft.....	Arabic	3,500 sq. ft.....	Armorial
300 sq. ft.....	Arbiter	4,000 sq. ft.....	Armpit
400 sq. ft.....	Arboret	5,000 sq. ft.....	Aromatics
500 sq. ft.....	Arcade	6,000 sq. ft.....	Arpeggio
600 sq. ft.....	Arcanum	7,000 sq. ft.....	Arquebuse
700 sq. ft.....	Archery	8,000 sq. ft.....	Arrayed
800 sq. ft.....	Ardency	9,000 sq. ft.....	Arrogant
900 sq. ft.....	Arena	10,000 sq. ft.....	Arrow
1,000 sq. ft.....	Argentine	12,000 sq. ft.....	Arsenical
1,200 sq. ft.....	Argosy	15,000 sq. ft.....	Arterial
1,500 sq. ft.....	Aridity	20,000 sq. ft.....	Artichoke
1,800 sq. ft.....	Armada	25,000 sq. ft.....	Articulate
2,000 sq. ft.....	Armature	30,000 sq. ft.....	Artificer
2,500 sq. ft.....	Arminian	40,000 sq. ft.....	Artillery
3,000 sq. ft.....	Armistice	50,000 sq. ft.....	Artisan



# Telegraph Code—Continued

## Heights

	Cipher Word		Cipher Word
13	-inch Ht.... Headland	26	-inch Ht.... Heptagon
14	-inch Ht.... Hearken	27 1/2	-inch Ht.... Heptarchy
15	-inch Ht.... Heartless	28	-inch Ht.... Heptachord
16	-inch Ht.... Heather	30	-inch Ht.... Herbage
18	-inch Ht.... Heedful	31	-inch Ht.... Heretic
19	-inch Ht.... Heiress	32	-inch Ht.... Heritage
20	-inch Ht.... Helmet	33	-inch Ht.... Heritable
21 1/2	-inch Ht.... Helsman	33 1/2	-inch Ht.... Hermetic
22	-inch Ht.... Helpmate	38	-inch Ht.... Heroic
23	-inch Ht.... Hemlock	39 1/2	-inch Ht.... Hesperian
24	-inch Ht.... Hempen	44	-inch Ht.... Hessian
25	-inch Ht.... Henchman	45	-inch Ht.... Heterodox

## Number of Sections

	Cipher Word		Cipher Word
2 Sections.....	Shackles	19 Sections.....	Sherry
3 Sections.....	Shadowy	20 Sections.....	Shielding
4 Sections.....	Shaggy	21 Sections.....	Shiftless
5 Sections.....	Shakerism	22 Sections.....	Shingles
6 Sections.....	Shallow	23 Sections.....	Shining
7 Sections.....	Shambles	24 Sections.....	Shipwreck
8 Sections.....	Shamrock	25 Sections.....	Shirkful
9 Sections.....	Sharpness	26 Sections.....	Shivering
10 Sections.....	Shattered	27 Sections.....	Shocking
11 Sections.....	Sheath	28 Sections.....	Shoddy
12 Sections.....	Sheepfold	29 Sections.....	Shoggle
13 Sections.....	Sheepish	30 Sections.....	Shopworn
14 Sections.....	Shekel	31 Sections.....	Shopping
15 Sections.....	Shellac	32 Sections.....	Shoulder
16 Sections.....	Shepherd	33 Sections.....	Shouting
17 Sections.....	Sherbet	34 Sections.....	Shoveling
18 Sections.....	Sheridan	35 Sections.....	Showery
Supply Steam leg section for single pipe.....	Showman		
Supply Steam leg section for double pipe.....	Shredded		
Supply Steam leg section with both supply and return at Bottom.....	Shrewish		
Supply Hot-Water leg section.....	Shrieked		
Blank leg section, Steam.....	Shrillness		
Return Steam leg section.....	Shrinkage		
Return Hot-Water leg section.....	Shrivel		
Intermediate Steam section.....	Shrubby		
Intermediate Hot-Water section.....	Shunning		
Middle Steam leg section.....	Shuttle		
Intermediate Hot-Water leg section.....	Shyness		
Drip leg section.....	Shistose		

# Telegraph Code—Continued

## Numeral Code

These figures may be used in giving quantities, order numbers, amounts in dollars, weights, car numbers, etc.

To make up a word above 99, use the code as follows: For example, 142—14 cet, 2 bef—"cetbef." Or, 1425—14 cet, 25 dlo—"cetdlo." Or, 14,254—14 cet, 25 dlo, 4 bot—"cetdlobot." Or, 142,547—14 cet, 25 dlo, 47 fod—"cetdlofod."

Or, say car number 100,009—10 cul, 00 ayd, 09 abu—"culaydabu."

Cipher Word	Cipher Word	Cipher Word
0.....Aeb	27.....Dim	64.....Hic
00.....Ayd	28.....Dys	65.....Hob
01.....Aux	29.....Dni	66.....Hue
02.....Arg	30.....Eic	67.....Hey
03.....Ame	31.....Eat	68.....Hak
04.....Ano	32.....Eub	69.....Hyk
05.....Aup	33.....Ewe	70.....Jim
06.....Ado	34.....Ens	71.....Jut
07.....Alm	35.....Ebi	72.....Jix
08.....Ast	36.....Ext	73.....Jeb
09.....Abu	37.....Esi	74.....Jyc
1.....Buc	38.....Efa	75.....Jri
2.....Bef	39.....Emp	76.....Jos
3.....Bix	40.....Fax	77.....Jlo
4.....Bot	41.....Fit	78.....Jak
5.....Bal	42.....Fub	79.....Jab
6.....Blu	43.....Feg	80.....Lin
7.....Bri	44.....Fri	81.....Lam
8.....Bum	45.....Flo	82.....Lux
9.....Boj	46.....Fys	83.....Loy
10.....Cul	47.....Fod	84.....Lek
11.....Clu	48.....Fam	85.....Lud
12.....Cam	49.....Fik	86.....Lyt
13.....Cro	50.....Gal	87.....Loe
14.....Cet	51.....Gig	88.....Lij
15.....Cug	52.....Gub	89.....Lub
16.....Cat	53.....Ger	90.....Mum
17.....Cle	54.....Gof	91.....Mib
18.....Cok	55.....Gri	92.....Mez
19.....Cwo	56.....Glu	93.....Myt
20.....Dam	57.....Gyt	94.....Max
21.....Dri	58.....Gum	95.....Mok
22.....Dup	59.....Gnu	96.....Muj
23.....Det	60.....Hyx	97.....Mil
24.....Dix	61.....Hab	98.....Mac
25.....Dlo	62.....Hel	99.....Mep
26.....Dox	63.....Hum	

# Telegraph Code—Continued

## Tapping Instructions

	Cipher Word
$\frac{3}{4}$ -in. single pipe.....	Tablature
$\frac{3}{4}$ x $\frac{3}{4}$ -in.....	Tableau
1-in. single pipe.....	Taffeta
1 x $\frac{3}{4}$ -in.....	Taciturn
1 x 1-in.....	Tactician
1 $\frac{1}{4}$ -in single pipe.....	Talisman
1 $\frac{1}{4}$ x $\frac{3}{4}$ -in.....	Taffrail
1 $\frac{1}{4}$ x 1-in.....	Taintless
1 $\frac{1}{4}$ x 1 $\frac{1}{4}$ -in.....	Tailoress
1 $\frac{1}{2}$ -in single pipe.....	Tangency
1 $\frac{1}{2}$ x 1-in.....	Talmud
1 $\frac{1}{2}$ x 1 $\frac{1}{4}$ -in.....	Tamarind
1 $\frac{1}{2}$ x 1 $\frac{1}{2}$ -in.....	Tandems
2-in. single pipe.....	Tannery
2 x 1 $\frac{1}{2}$ -in.....	Tangling
Tapped at "A".....	Tantalize
Tapped at "B".....	Tapestry
Tapped at "C".....	Tapioca
Tapped at "D".....	Tarpaulin
Tapped at "E".....	Tartaric
Tapped at "F".....	Tautology
Tapped at "G".....	Taxidermy
Tapped at "H".....	Tiara
Tapped right hand.....	Tibial
Tapped left hand.....	Ticklish
Tapped for single-pipe Steam as per list.....	Tidiness
Tapped for double-pipe Steam as per list.....	Tidology
Tapped for top supply and bottom return on same end.....	Tillage
Tapped for top supply and bottom return on opposite ends.....	Timbrel
Tapped for both supply and return tapplings at bottom of same end.....	Timidity
Tapped for $\frac{1}{4}$ -inch air valves.....	Tipstaff
All to have detachable high legs, so that the distance from floor to center of supply tapping shall be..... inches.....	Titmouse
All to have extra-high solid legs, so that the distance from floor to center of supply tapping shall be..... inches.....	Titular
Insert blind nipple at top between loop and return leg section.....	Timoneer
Outside thread to be left-handed.....	Timist

## Style and Kind of Radiators

	Cipher Word
Ætna Flue Steam.....	Bachelor
Ætna Flue Water.....	Babyhood



# Telegraph Code—Continued

## Style and Kind of Radiators—Continued

	Cipher Word
Areal Sanitary Box-base No. 10 for Steam.....	Babblement
Areal Sanitary Box-base No. 15 for Steam.....	Babbling
Astro Two-Column Steam.....	Babington
Astro Two-Column Water.....	Babillard
Cardinal Indirect.....	Balloon
Circular for Water.....	Balmify
Circular for Steam.....	Balneal
Corner for Water.....	Bandage
Corner for Steam.....	Bandala
Curved for Water.....	Bandbox
Curved for Steam.....	Bandeau
Dining-Room Water.....	Bandore
Dining-Room Steam.....	Baresark
Direct-Indirect for Water.....	Barbule
Direct-Indirect for Steam.....	Bardish
Excelsior Indirect Water.....	Barilla
Excelsior Indirect Steam.....	Barkery
Excelsior Junior Indirect Steam.....	Barmaid
Italian Ornamental Flue Box-base Water.....	Barrage
Italian Ornamental Flue Box-base Steam.....	Barrier
Italian Ornamental Flue Water.....	Bartery
Italian Ornamental Flue Steam.....	Barwood
Peerless Single-Column Water.....	Battalia
Peerless Single-Column Steam.....	Baubles
Peerless Two-Column Water.....	Batting
Peerless Two-Column Steam.....	Battled
Peerless Three-Column Water.....	Battuta
Peerless Three-Column Steam.....	Batture
Peerless Four-Column Steam.....	Bavaroy
Peerless Four-Column Water.....	Baybolt
Perfection Pin Indirect, ex. large, bolt and flange..	Beatify
Perfection Pin Indirect, standard, bolt and flange..	Beating
Perfection Pin Indirect, extra large, with right and left-hand threaded nipple connections.....	Beauish
Perfection Pin Indirect, standard size, with right and left-hand threaded nipple connections.....	Becloud
Rococo Single-Column Steam.....	Beehouse
Rococo Single-Column Water.....	Beebread
Rococo Two-Column Steam.....	Beechnut
Rococo Two-Column Water.....	Beachtree
Rococo Three-Column Steam, right- and left-hand threaded nipples.....	Behemoth
Rococo Three-Column Water, with right- and left-hand threaded nipple connections.....	Beehive
Rococo Three-Column Steam, with right-hand threaded nipples.....	Beldame



# Telegraph Code—Continued

## Style and Kind of Radiators—Continued

	Cipher Word
Rococo Three-Column Water, with slip nipples..	Beggary
Rococo Four-Column Steam, with right- and left-hand threaded nipples.....	Benitier
Rococo Four-Column Water, with right- and left-hand threaded nipples.....	Benignly
Rococo Box-Base Water.....	Benumbed
Rococo Box-Base Steam.....	Benshee
Rococo Window, Steam.....	Bellcrank
Rococo Window, Water.....	Bellbird
Rococo Wall 5-ft., Vertical, Steam.....	Boldfaced
Rococo Wall, 5-ft., Vertical, Water.....	Bolster
Rococo Wall, 5-ft., End-tapped, Steam.....	Bolthead
Rococo Wall, 5-ft., End-tapped, Water.....	Bolting
Rococo Wall, 7-ft., Side-tapped, Steam.....	Boltonite
Rococo Wall, 7-ft., Side-tapped, Water.....	Boltrope
Rococo Wall, 7-ft., End-tapped, Steam.....	Boltsprit
Rococo Wall, 7-ft., End-tapped, Water.....	Bolection
Rococo Wall, 9-ft., Side-tapped, Steam.....	Bolero
Rococo Wall, 9-ft., Side-tapped, Water.....	Boletic
Rococo Wall, 9-ft., End-tapped, Steam.....	Boletus
Rococo Wall, 9-ft., End-tapped, Water.....	Bolivian
Sanitary School Pin Indirect, Steam.....	Beleaguer
Sanitary School Pin Indirect, Water.....	Belowt
Stairway for Steam.....	Believer
Sterling Indirect.....	Benefit
Vento Blast Heater, Regular, 40-inch.....	Bergamot
Vento Blast Heater, Regular, 50-inch.....	Berberine
Vento Blast Heater, Regular, 60-inch.....	Bergamask
Vento Blast Heater, Narrow, 40-inch.....	Berime
Vento Blast Heater, Narrow, 50-inch.....	Berkshire
Vento Blast Heater, Narrow, 60-inch.....	Bermuda
Verona Steam.....	Bidental
Verona Water.....	Bicycle

## Radiator Miscellanies

	Cipher Word
Box-Base with back opening, Detroit Plant....	Machinate
Box-Base with bottom opening, Detroit Plant...	Madregal
Box-Base with back opening, Titusville Plant...	Madcaps
Box-Base with bottom opening, Titusville Plant,	Macrology
Box-Base, New Adjustable, back opening.....	Macrometer
Box-Base, New Adjustable, bottom opening.....	Macron
Brackets, No. J.....	Macerated
Brackets, No. K.....	Macrotous
Brackets, No. L.....	Magically
Brackets, No. M.....	Magistracy
Brackets, No. N.....	Magisterial

# Telegraph Code—Continued

## Radiator Miscellanies—Continued

	Cipher Word
Brackets, No. O.....	Magnesium
Brackets, No. P.....	Magenta
Bushings, 2 inches, reducing to 1½ inches.....	Magnate
Bushings, 2 inches, reducing to 1¼ inches.....	Magnetic
Bushings, 2 inches, reducing to 1 inch.....	Magnolia
Bushings, 2 inches, reducing to ¾ inch.....	Mahogany
Bushings, 1½ inches, reducing to 1¼ inches.....	Magnific
Bushings, 1½ inches, reducing to 1 inch.....	Magnify
Bushings, 1½ inches, reducing to ¾ inch.....	Magnitude
Bushings, 1½ inches, reducing to ½ inch.....	Magpie
Carpet Feet, arranged with detachable.....	Malapert
Dampers, Floor.....	Malicious
Legs, fitted with detachable Carpet (legs or feet).....	Mammoth
Nipples, 2 -inch 90° right and left hand.....	Manacle
Nipples, 1½-inch 90° right and left hand.....	Mandarin
Nipples, 2 -inch 90° right and left hand with hexagon nut at center.....	Mandatory
Nipples, 2 -inch 60° right and left hand.....	Mandrake
Nipples, 1½-inch 60° right and left hand.....	Manequin
Nipples, 2 -inch 60° right and left hand (hexagon nut).....	Manfulness
Nipples 2-inch, right-hand threaded.....	Manhood
Nipples, 2¼-inch slip.....	Manifesto
Pedestals... inches high.....	Manifold
Pedestals to make distance from floor to center of supply tapping... inches.....	Mankind
Plugs, 2- inch.....	Mannerism
Plugs, 1½-inch.....	Maneuver
Plugs, ½-inch Brass (for air valve tapping).....	Marauder
Saddles for marble tops.....	Marginal
Tops, fitted with lugs for marble.....	Marksman
Tops, fitted with saddles for marble.....	Martingal
Wall Boxes, Detroit Plant.....	Matadore
Wall Boxes Titusville Plant.....	Maternity

## Ideal Sectional Boilers

Water		Steam	
Number	Cipher Word	Number	Cipher Word
W-15-4.....	Society	S-15-4.....	Solania
W-15-5.....	Socotrine	S-15-5.....	Solanine
W-15-6.....	Socinian	S-15-6.....	Soldanrie
W-19-5.....	Soever	S-19-5.....	Soapmaker
W-19-6.....	Sofism	S-19-6.....	Soapberry
W-19-7.....	Softener	S-19-7.....	Soapfish
W-22-5.....	Solstice	S-22-5.....	Sojourn
W-22-6.....	Soken	S-22-6.....	Soidisant
W-22-7.....	Solander	S-22-7.....	Soiliness

# Telegraph Code—Continued

## Ideal Sectional Boilers—Continued

Water		Steam	
Number	Cipher Word	Number	Cipher Word
W-25-5	Solanoid	S-25-5	Sobbing
W-25-6	Soldanel	S-25-6	Soberize
W-25-7	Soldering	S-25-7	Soberness
W-25-8	Solenette	S-25-8	Sobriety
W-28-5	Somonour	S-28-5	Sonneteer
W-28-6	Soiree	S-28-6	Sonometer
W-28-7	Somatics	S-28-7	Sonority
W-28-8	Somnolism	S-28-8	Sontag
W-36-5	Solarizer	S-36-5	Sostenuto
W-36-6	Sclelin	S-36-6	Socratic
W-36-7	Soliform	S-36-7	Sobriquet
W-36-8	Solecize	S-36-8	Souchong
W-36-9	Solvend	S-36-9	Souded
W-36-10	Solfeggio	S-36-10	Souffle
W-48-6	Solpugid	S-48-6	Sotadic
W-48-7	Solert	S-48-7	Sothiac
W-48-8	Sophomore	S-48-8	Sorrowed
W-48-9	Soricine	S-48-9	Sorrance
W-48-10	Sortition	S-48-10	Sororize

## Premier Boilers

Steam		Water	
Number	Cipher Word	Number	Cipher Word
1015	Nabit	1115	Napkinweb
2015	Nabob	2115	Napless
3015	Nacarar	3115	Nappiness
1018	Nacker	1118	Narrated
2018	Nacreous	2118	Narrowing
3018	Nacrum	3118	Nariform
1021	Nadir	1121	Nasalize
2021	Naenia	2121	Nascency
3021	Naebose	3121	Nasoseptal
4021	Nagging	4121	Nathless
1024	Naiad	1124	Natica
2024	Nayak	2124	Nativeness
3024	Nailbrush	3124	Natron
4024	Naileress	4124	Naturism
1027	Nainsook	1127	Nautical
2027	Namable	2127	Nautilaus
3027	Namation	3127	Nautiform
4027	Nameless	4127	Nautilite

## Arco Water and Laundry Heaters

Number	Cipher Word	Number	Cipher Word
10	Queenbird	15	Queenfish
12	Queencraft	1-D	Kingless



# Telegraph Code--Continued

## Peerless Boilers

Steam		Water	
Number	Cipher Word	Number	Cipher Word
1500.....	Cabalist	1501.....	Cachexia
1600.....	Cabbling	1601.....	Cacochymy
1800.....	Cabriolet	1801.....	Cacodemon
1900.....	Cachalot	1901.....	Cacography

Junior Water Heaters	
Number	Cipher Word
0.....	Jubilant
10.....	Jubilee
12.....	Judgment
20.....	Judicial
22.....	Jugular
30.....	Juiciness
32.....	Juniper

## Premier Junior Water Heaters

Number	Cipher Word
101.....	Kangaroo
121.....	Keelsons
122.....	Kennels
151.....	Ketchup
152.....	Kinology
181.....	Kiosks
182.....	Kiote

## Arco Boilers

Water		Steam	
Number	Cipher Word	Number	Cipher Word
1-19-W.....	Lancinate	1-19-S.....	Laborious
1-22-W.....	Lapidary	1-22-S.....	Lacerated
1-25-W.....	Lastage	1-25-S.....	Lamantine
1-28-W.....	Laureate	1-28-S.....	Lamentable
1-31-W.....	Laudable	1-31-S.....	Lamellose
1-34-W.....	Laurentian	1-34-S.....	Lambdoidal
2-19-W.....	Landloping	2-19-S.....	Labyrinth
3-19-W.....	Laumontite	3-19-S.....	Labroid
2-22-W.....	Lassitude	2-22-S.....	Lackaday
3-22-W.....	Lauraceous	3-22-S.....	Laccolite
2-25-W.....	Laudatory	2-25-S.....	Lamella
3-25-W.....	Laurinol	3-25-S.....	Lambaste
2-28-W.....	Lawfulness	2-28-S.....	Laminated
3-28-W.....	Lawgiving	3-28-S.....	Lambative
2-31-W.....	Lawmonger	2-31-S.....	Lambrequin
3-31-W.....	Lawsonia	3-31-S.....	Lamskin
2-34-W.....	Lawyerlike	2-34-S.....	Lamellary
3-34-W.....	Lawmaking	3-34-S.....	Lampless



# Telegraph Code—Continued

## Standard Boilers

### Water

Number	Cipher Word	Number	Cipher Word
15-1-W.....	Gaellic	25-3-W.....	Gamesome
17-1-W.....	Gadhelic	25-4-W.....	Garmentur
17-2-W.....	Gainless	28-1-W.....	Garnishee
17-3-W.....	Galatian	28-2-W.....	Garrisons
19-1-W.....	Gallantry	28-3-W.....	Gasolines
19-2-W.....	Galleries	28-4-W.....	Gatling
19-3-W.....	Gallivant	31-1-W.....	Gaudiness
22-1-W.....	Galloping	31-2-W.....	Gaugeable
22-2-W.....	Galvanism	31-3-W.....	Gauntless
22-3-W.....	Gambroon	31-4-W.....	Gavelock
22-4-W.....	Gambadoes	34-1-W.....	Gazements
25-1-W.....	Gammon	34-2-W.....	Gazetteer
25-2-W.....	Gamester	34-3-W.....	Gazeebo
		34-4-W.....	Gazelle

## Fire-Box Boilers and Parts

	Cipher Word
Acme Fire-Box only.....	Fibrillar
Acme Fire-Box Boiler with castings.....	Fickleness
Acme Fire-Box Boiler with castings and with steam trimmings.....	Fictitious
Tapped for Steam.....	Fidelity
Tapped for Water.....	Fiducial
Front Arch Plate for Acme Fire-Box Boiler (No.....)	Fiendishly
Rear Covering Plate and Slide Damper.....	Figment
Steam Trimmings, complete.....	Filaments
Compression Valves, $\frac{3}{8}$ -inch.....	Filanders
Damper Regulator, complete.....	Filchings
Safety Valve (.... inches).....	Filiation
Steam Gauge.....	Filibuster
Water Column Castings.....	Filigree
Water Column, complete.....	Filtering
Fire Door and Frame.....	Fringed
Ash-Pit Front.....	Friskers
Large Soot Door.....	Frittered
Small Soot Doors.....	Frolicer
Acme Shaking Grates.....	Frontier
To contain (....) tubes instead of regular.....	Fructify

## IDEAL Cylindrical Steel Boilers

Size of Boiler	Cipher Word	Size of Boiler	Cipher Word
1200.....	Abdicate	2600.....	Ablative
1500.....	Abditory	3000.....	Abnegate
1800.....	Abduction	3600.....	Abolition
2200.....	Aberrance	4500.....	Abrasion

# Telegraph Code—Continued

## IDEAL Boiler Parts

	Cipher Word
Front Section.....	Jacinth
Back Section.....	Jackals
Closed Front Flue Connecting Section.....	Jackets
Open Front Flue Connecting Section.....	Jackman
Open Center Section.....	Jacksaw
Closed Center Section.....	Jaded
Open Connecting Section.....	Jagged
Closed Connecting Section.....	Jailbird
Rear Connecting Section.....	Jailers
Half-Open Center Section.....	Jalaps
Half-Open Connecting Section.....	Jangled
Closed 4-Flue Center Section.....	Jangling
Closed 5-Flue Center Section.....	Janitor
Rear Center Section.....	Jankers
Single Section.....	Jargons
Double Section.....	Jarring
Dome Section.....	Jasmine
Fire-Pot Section.....	Jasper
First Section over Fire-Pot.....	Javelin
Second Section over Fire-Pot.....	Jaunting
Third Section over Fire-Pot.....	Jauntily

## Heating Specialties, etc.

	Cipher Word
Air Valves, Arco, Automatic.....	Reacted
Air Valves, Compression, Wood Wheel, O. S.....	Reaction
Air Valves, Compression Key, O. S.....	Reapers
Air Valves Imperial Automatic, Lock and Shield.....	Rebuffed
Air Valves, Imperial Automatic, Straight Shank.....	Rebus
Air Valves, Libra Automatic.....	Rebuking
Air Valves, Norwall Automatic Air and Vacuum.....	Recapper
Air Valves, Norwall.....	Recanter
Air Valves, Norwall Siphon.....	Recamier
Air Valves, Allen.....	Recapture
Air Valves, Sylphon Automatic Air.....	Recasting
Air Valves, Sylphon Vacuum.....	Recense
Air Valves, Sylphon 527.....	Recidivate
Air Valves, Sylphon 525.....	Recidivous
Air Valves, Sylphon 526.....	Reclaimable
Air Valves, Victor Automatic, Style 2.....	Rechoose
Air Cell Covering.....	Recharter
Asbestocel Covering.....	Reckless
Asbestos Covering 85% Magnesia (.... ft of).....	Recipes
Asbestos Cement, Plastic (.... pounds of).....	Recipient
Asphaltum, Black (.... gallons of).....	Recitals
Auxiliary Water Heater.....	Recluse
Bronze, Pale Gold (.... pounds of).....	Reckoned

# Telegraph Code—Continued

## Heating Specialties, etc.—Continued

	Cipher Word
Bronze, Rich Gold (.... pounds of) .....	Reckoning
Bronzing Liquid (.... cans of) .....	Recoction
Brushes, Radiator.....	Recoined
Brushes, Fitch.....	Recondite
Brushes, Flue.....	Recouper
Cement, Asbestos (.... pounds of) .....	Recolonize
Covering, Wool Felt, Molded (.... feet of) .....	Reconjoin
Covering, 85% Magnesia (.... feet of) .....	Reconvene
Diaphragm, Rubber.....	Recorders
Distributers, O. S. (No.....)	Rectitude
Elbows, Union (No.....)	Rectory
Enamel (.... cans of).....	Recuperate
Floor and Ceiling Plates, Imperial.....	Recusant
Floor Plates, B. & C., black.....	Recrement
Floor Plates, B. & C., N. P.....	Recreative
Ceiling Plates, B. & C., black.....	Recrudency
Ceiling Plates, B. & C., N. P.....	Rectorial
Gauges, Steam.....	Reelection
Gauges, Altitude.....	Refectory
Gauges, Pressure and Vacuum.....	Referment
Generator, Honeywell Heat.....	Refinement
Japan, Maroon (.... cans of) .....	Reflex
O. S. Distributers (No.....)	Refractory
Pipe Bending Forms.....	Regnative
Pipe Threading Machines, Toledo (No.....)	Regrater
Putty for Boilers (.O. pound can).....	Regiments
Paste, Pipe Joint, Fraser's.....	Regnancy
Plinth Blocks, Ideal Expansion.....	Regression
Reamers, Ideal Burring.....	Regicide
Reamers, Improved.....	Regummed
Regitherm, Sylphon, Ideal.....	Rejecting
Reducing Valve, Sylphon.....	Rejectment
Regulator, Sylphon No. 22.....	Relapsed
Regulator, Sylphon No. 42.....	Relatrix
Regulator, Sylphon No. 43.....	Remorate
Regulator, Sylphon No. 44.....	Remanet
Regulator, Sylphon No. 52.....	Remade
Regulator, Sylphon No. 930.....	Remontoir
Regulator, Sylphon No. 924.....	Remordency
Shields, Radiator (with vapor pan).....	Relentless
Shields, Radiator (without vapor pan).....	Religion
Tank Brackets.....	Remount
Tanks, Expansion, Galvanized Steel (No.....)	Reliquary
Tanks, Expansion (No.....), with trimmings....	Reluctant
Tanks, Expansion, Automatic, Wood Case (No....)	Remedies
Tanks, Extra Heavy, Black Steel, Horizontal (.....gallons) .....	Remittal



# Telegraph Code—Continued

## Heating Specialties, etc.—Continued

Tanks, Extra Heavy, Black Steel, Vertical (..... gallons).....	Remissible
Tanks, Pneumatic Steel.....	Remissed
Tanks, Storage, Black Steel, Horizontal (..... gallons).....	Remission
Tanks, Storage, Black Steel, Horizontal (with black pipe coil) (....gallons).....	Remiss
Tanks, Storage, Black Steel, Horizontal (with galvanized pipe coil) (....gallons).....	Remorse
Tanks, Storage, Black Steel, Vertical (.... gallons).....	Remorseful
Tanks, Storage, Galvanized, Horizontal (.... gallons).....	Renounce
Tanks, Storage, Galvanized, Vertical (....gallons).....	Renowned
Thermometers, Straight.....	Reorganize
Thermometers, Angle.....	Repand
Tool Chest, Style A, One Drawer.....	Repartee
Tool Chest, Style A, Two Drawers.....	Repaganize
Tool Chest, Style C.....	Repellent
Tool Chest, Style D.....	Replicant
Valves, Gate, No. 335, Iron Wheel, Brass.....	Reprimand
Valves, Gate, No. 373, Wood Wheel, Brass Union.....	Republican
Valves, Gate, Norwall, No. 304.....	Reprisal
Valves, Gate, Norwall, No. 305.....	Reputation
Valves, Globe, No. 178, Iron Wheel.....	Requisite
Valves, Globe, No. 189, Wood Wheel, Union....	Rescuers
Valves, Improved Hot-Water, Bonnetless, Quick-Opening.....	Requitting
Valves, Hot-Water, Bonnetless, Quick-Opening (No.....)	Residual
Valves Hot-Water, Bonneted, Quick-Opening (No.....)	Resistance
Valves, Hot-Water, Straightway, Quick-Opening (No.....)	Resolution
Valves, Unique Water.....	Resorcin
Valves, Improved Quick-Opening, Water.....	Retractor
Valves, Packless Radiator, Norwall, Angle.....	Retraxit
Valves, Packless Radiator, Norwall, Corner....	Retreatful
Valves, Packless Radiator, Sylphon, No. 345....	Retribute
Valves, Packless, Sylphon Corner, No. 346.....	Retrussed
Valves, Fractional Steam, Ideal.....	Retrusion
Valves, Pop Safety, Ideal.....	Retrench
Valves, Pop Safety, Norwall.....	Retrial
Valves, Steam, Angle, Screw-Stem, with Jenkins Disc (No.....)	Revengeful
Valves, Screw-Stem, Steam, with Union.....	Revolutive
Valves, Steam, Corner, Screw-Stem (No.....)	Revolver



# Telegraph Code—Continued

## Heating Specialties, etc.—Continued

	Cipher Word
Valves to be equipped with lock and shield.....	Revolution
Vise, Combination Bench Pipe.....	Revocater
Vise, Toledo Pipe (No.....)	Revolvable
Wool-Felt Covering (....ft. of).....	Reviewers
Wrenchers, Spud, Style 1.....	Revulsion
Wrenches, Spud, Style 2.....	Revamping
Wrenches, Ideal Chain.....	Reverdure

### Addenda

(Received too Late to Classify)

	Cipher Word
Arco Wall Bracket No. 1.....	Revere
Arco Wall Bracket No. 2.....	Reverend
Arco Wall Bracket No. 3.....	Reversis
Arco Wall Bracket No. 4.....	Revertive
Arco Wall Bracket No. 5.....	Revesture
Arco Wall Bracket No. 12.....	Rigadoon
Arco Wall Bracket No. 22.....	Rigafir
Arco Wall Bracket No. 32.....	Rigation
Arco Wall Bracket No. 42.....	Rigescent
Arco Wall Bracket No. 52.....	Rigger

Memoranda

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# Telegram Memoranda Continued

## Heating Specialties, etc.—Continued

Valves to be equipped with lock and shield . . . . .	Cipher Word
Vise, Combination Bench Pipe . . . . .	Revolution
Vise, Toledo Pipe (No. . . . .)	Revocater
Wool-Felt Covering ( . . . ft. of) . . . . .	Revolvable
Wrenches, Spud, Style 1 . . . . .	Reviewers
Wrenches, Spud, Style 2 . . . . .	Revolucion
Wrenches, Ideal Chain . . . . .	Revamping
	Reverence

## Addenda

(Received too Late to Classify)

Arm Wall Bracket No. 1 . . . . .	Cipher Word
Arm Wall Bracket No. 2 . . . . .	Reverse
Arm Wall Bracket No. 3 . . . . .	Reveread
Arm Wall Bracket No. 4 . . . . .	Reversis
Arm Wall Bracket No. 5 . . . . .	Revertive
Arm Wall Bracket No. 12 . . . . .	Revestung
Arm Wall Bracket No. 22 . . . . .	Rigadoon
Arm Wall Bracket No. 32 . . . . .	Rigabit
Arm Wall Bracket No. 42 . . . . .	Rigation
Arm Wall Bracket No. 52 . . . . .	Rigexent
	Rigger

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